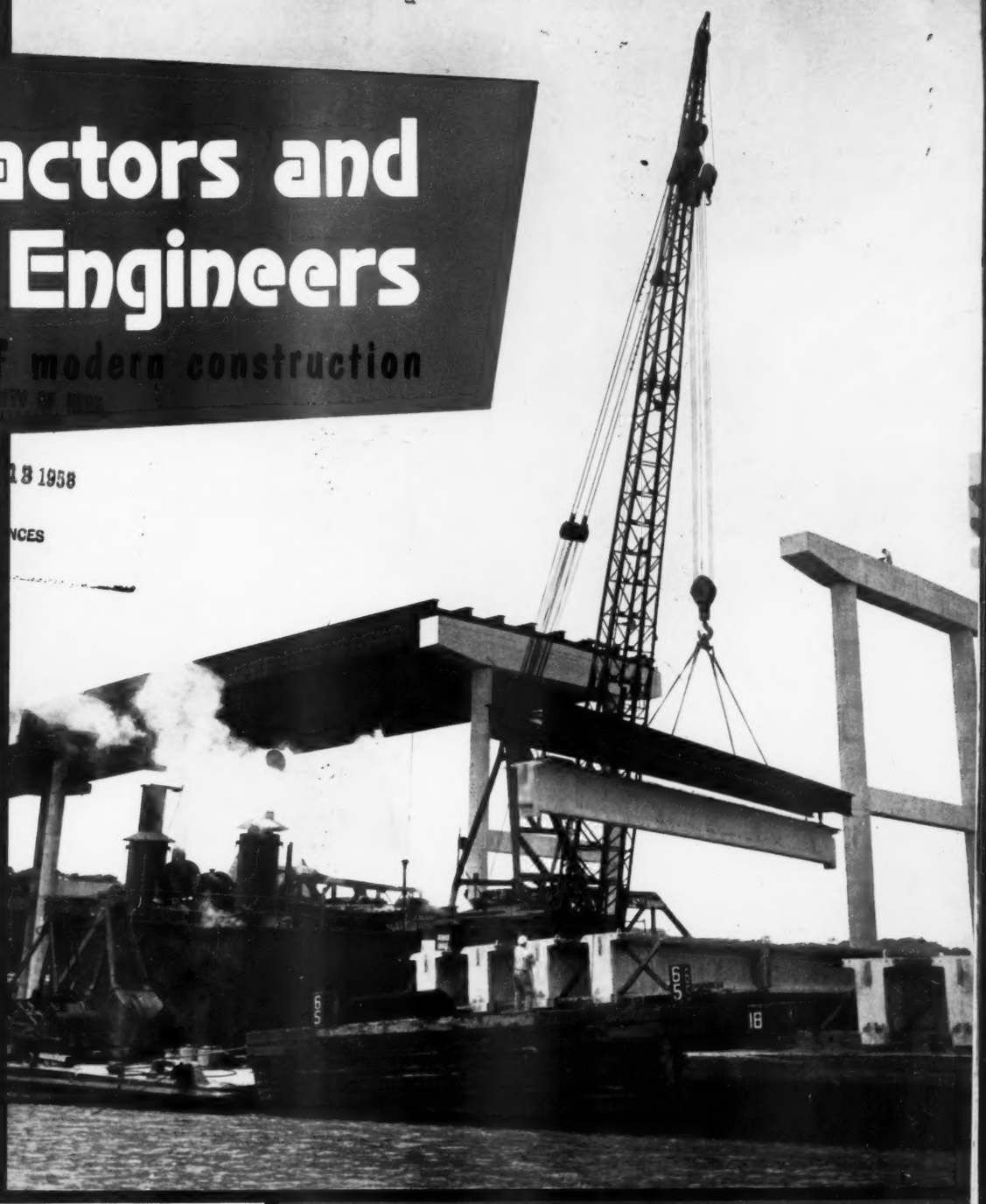
Contractors and Engineers

magazine of modern construction

SEPTEMBER 1958

A Buttenheim Publication



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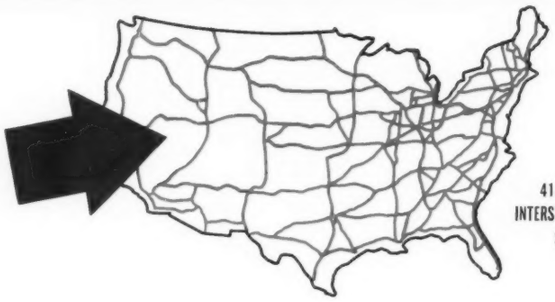

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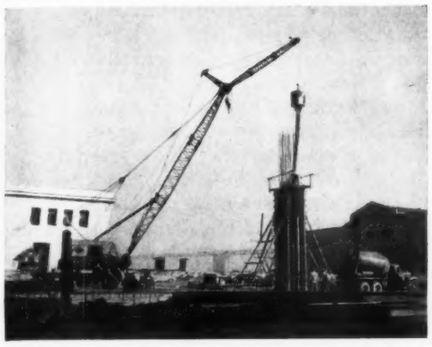

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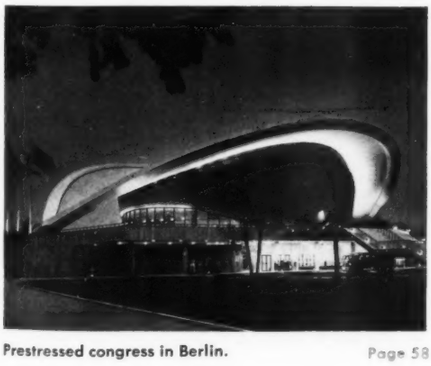

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Boulder excavation on canyon road. Page 80

Editorial

In the spotlight:

Prestressed concrete

The construction industry and the civil engineers who usually direct its operations have often been criticized for being inarticulate in letting the world know of accomplishments in that field. It is gratifying, then, to observe that one of the newer branches of the industry, prestressed-concrete construction, is not remiss in that respect. Within 14 months, three significant meetings have been scheduled to report on progress and problems in prestressing.

Last year, from July 27 through August 2, the first World Conference on Prestressed Concrete was held in San Francisco with representatives from 29 countries present. From May 5 through May 10 this year, Berlin was the gathering place for the Third International Prestressed Concrete Congress which drew delegates from 44 countries (see page 58). The two previous meetings of the World Congress took place in London (1953) and Amsterdam (1955). This month, from September 22 through 25, the Prestressed Concrete Institute is holding its fourth annual meeting and convention at the Edgewater Beach Hotel in Chicago. The PCI, with headquarters in Boca Raton, Fla., is only four years old but already has 500 members. The organization, international in scope and with many foreign members, has mailed announcements of its convention to some 11,000 potential registrants. This gives an idea of how big prestressing has grown and the number of people with a stake in it. The convention will also have an exhibit at which 39 suppliers will show and explain their equipment, materials, and services.

Prestressing is a field that has stirred up interest all over the globe. These international meetings can be a source of inspiration to all, even if local conditions do not always favor outright imitation of methods or techniques. Closer contacts and personal relationships among engineers of many lands advance the individual's own knowledge and understanding of the subject. Their countries also gain from any new ideas the delegates bring back with them. Such values cannot be measured with a yardstick, but they do exist.

Speaking of yardsticks, is it not about time for this country to reappraise its system of weights and measures, and to consider the value of dropping the inch-foot-yard linear and square measure for the metric tables? Technicians from the U.S.A., coming into contact on the Continent with the meter and gram, almost always admit, albeit grudgingly, that there are advantages to the decimal system of measure and weight. And after using the metric system for a short time, the American is quite apt to concede that there is nothing very mysterious about it and that it has many advantages in speeding mathematical computations.

The adoption of the metric system could be another step in bringing engineers from all over the world more closely together. India is changing to the metric system of weight and measure, having successfully adopted a decimal currency system last April. Track and field teams from the U.S.A., competing in Europe this summer, raced metric distances rather than yards or miles. Standardization here would promote better understanding of such athletic events among both spectators and participants. It could do the same in engineering.

In this Prestressing issue of CONTRACTORS AND ENGINEERS we are presenting, in addition to a first-hand account of the Berlin Congress, the start of a series on European precast and prestressed concrete and eight articles on prestressing in the U.S.A. The stories, on work being done across the continent from New Jersey to California, range in subject matter from commercial plants, through beam and girder construction and erection techniques, to the manufacture of Spunpiles. For those who cannot make the conventions in person, here are some of the latest developments in the technique of prestressed concrete.

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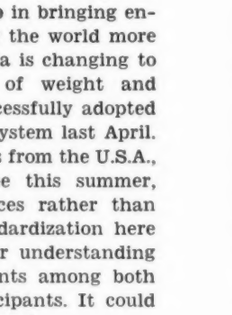

An American Revolver sets an 80-foot-long prestressed girder for the Petaluma Creek bridge near Novato, Calif. (*Page 30.*) Post-tensioning of girders for a twin bridge near Des Moines is being done by a Seco hydraulic pump driven by a Wisconsin engine. (*Page 42.*)

Associated Publications

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Prestressed-concrete men to convene in Chicago for fourth annual meet

On the 22nd of this month, the fourth annual convention of the Prestressed Concrete Institute will get under way at the Edgewater Beach Hotel in Chicago, Ill.

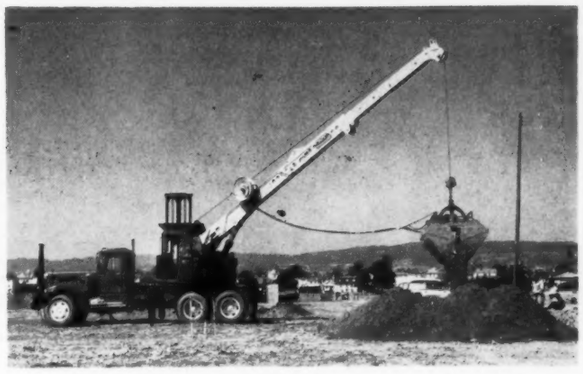
The keynote speaker at the 4-day convention will be Charles Luckman, partner in the architectural and engineering firm of Pereira & Luckman of Los Angeles and New York City. He will address the convention on the subject of marketing.

Also addressing the delegates will be Ralph E. Knight and James R. Hawkinson on "The Challenge of Marketing". Knight is a vice president and director of Research and Development of the Kaiser Aluminum & Chemical Corp., Oakland, Calif. Hawkinson is a professor of marketing in the School of Business of Northwestern University.

Thirty-nine companies connected with the prestressed-concrete field will have booths at the convention. Included among these are American-Marietta Co.; Basalt Rock Co., Inc.; Bethlehem Steel Co.; Bucyrus-Erie Co.; Container Corp. of America; CONTRACTORS AND ENGINEERS; Food Machinery & Chemical Corp.; Hopkins Volcanic Specialties, Inc.; Illinois Prestressed Concrete Association; and Intercontinental Equipment Co., Inc.

Also exhibiting are International Prestressing Corp.; Leschen Wire Rope Division, H. K. Porter Co., Inc.; *Concrete Products Magazine;* Marine Travelift & Engineering, Inc.; Master Builders Co.; *Modern Concrete Magazine;* Plant City Steel Corp.; and Preload Co.

Company displays are also presented by Prescon Corp.; Prestressed Concrete Institute; Raymond International Inc.; Remington Arms Co.; Rodgers Hydraulic, Inc.; Rods, Inc.; John A. Roebling's Sons Corp.; Sika Chemical Corp.; Silent Hoist & Crane Co., Inc.; The T. L. Smith Co.; Soiltest, Inc.; Star Precision Devices, Inc.; Stow Mfg. Co.; Stressteel Corp.; Superior Concrete Accessories, Inc.; Supreme Products Corp.; U. S. Steel Corp.; Union Wire Rope Corp.; Viber Co.; Vibro Plus Products, Inc.; and Wyzenbeck & Staff, Inc.



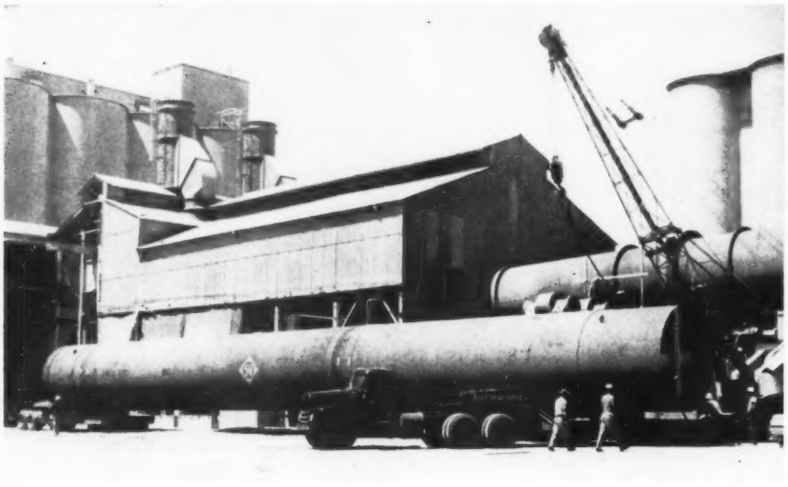
FOOTINGS FOR A MULTIMILLION-DOLLAR shopping and housing center are dug by a Bucyrus-Erie H-5 Hydrocrane with a ½-yard clam. The crane, mounted on a Peterbilt truck, is being used by Utah Construction Co., Salt Lake City, Utah, the contractor on this South Shore Center in Alameda, Calif. The center is being developed on a 400-acre site near San Francisco Bay.

Brussels Fair

To the Editor
CONTRACTORS AND ENGINEERS

I was delighted to read your August editorial, "Missing the Boat at the Fair". You certainly voiced my opinion completely about the contents of the U. S. Pavilion at the Brussels World Exhibition. I hope all your subscribers will see and read it. I want to compliment you also for the wonderful photographs on page 6 in August under the heading "Brussels Fair Exhibits Construction Machinery", as well as the accompanying article.

George W. Katterjohn, Pres.
Katterjohn Concrete Products Co.
Paducah, Ky.



A P&H 30-ton crane prepares to lift one end of this 118-foot-long kiln section off one of the low-beds which brought it to the erection site. Note timber bracing inside end of section.

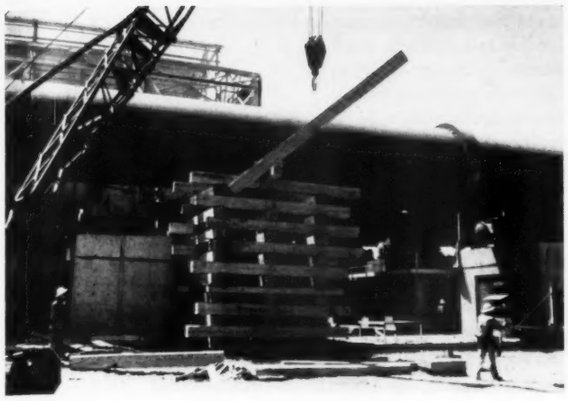
Plant expansion job calls for big lifts

Setting an 11×230-foot kiln on piers to within a thousandth of a foot was one of the challenges faced by the Macdonald Engineering Co., Chicago, during a $7.3 million expansion of the Monarch Cement Co., Humboldt, Kans.

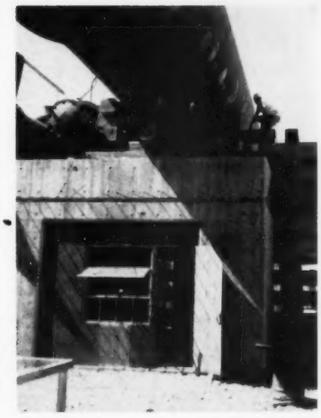
Even getting the big steel kiln to the job was a considerable feat. Six railroad flatcars were necessary to transport the two sections of the 176-ton steel cylinder. Hauling each section from the railhead to the project required two diesel trucks with lowbeds. To make the mile haul, one truck headed forward carrying one end of the cylinder, and the other truck, heading in the opposite direction and driving in reverse, carried the other end.

Setting the 86 and 90-ton sections on the piers took big cranes and plenty of patience. Since each cylinder was too heavy for cranes to lift directly to the piers, timber cribbing had to be used to step up each end of the cylinder 2 feet at a time. A 30-ton crane lifted up one end, while a smaller crane helped to place the timbers under the raised end. Then the large rig walked back to the lower end and lifted it 2 feet. Two cribs of timber at one-third points supported the kiln section as it was stepped up to the top of the piers.

The kiln, which was added to the two already in use, has increased Monarch's production to 7,500 barrels per day. Construction on the $7.3 million expansion project was started by Macdonald in August of 1956, and was completed this last April. Other facilities included in the expansion are a new laboratory building, a



A crane lifts a piece of timber used in bracing the inside of one section of the kiln while it is jacked forward to couple with another section. Timber cribbing is temporary support for this 118-foot-long section.



Here the section of kiln has been moved onto the pier. Temporary cribbing at right was used to raise the section to this height. The contractor uses the space between the concrete walls of the pier as a temporary office.

maintenance and machine shop, and 12 storage silos.

New crushing plant

As part of the program a new limestone crushing plant, capable of processing 450 tons of rock per hour, was built in the nearby quarry. The plant contains an Allis-Chalmers 225-ton gyratory crusher that reduces shovel-size rock to 5-inch material. A hammermill in the plant further reduces the size of the rock to minus ¾ inch. A belt conveyor system, also built under the program, carries the material for one-half mile to storage silos at the cement plant.

In making the portland cement, the crushed limestone is proportioned with shale and clay, and then flash-dried in a single-drum drying chamber. After a grinding process that reduces the mixture to a fine powder, it is pumped by air pressure through pipes to the receiving end of the rotating kiln.

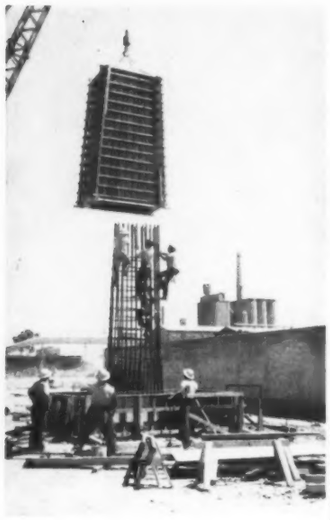
As the rock-shale powder passes from the high to the low end of the kiln, it is heated to 2,850 degrees F, which turns the powder into white-hot clinkers. The clinkers drop from the discharge end of the kiln onto an air-quenching cooler that cools the clinkers before they are conveyed to the temporary storage piles. After a small percentage of gypsum rock is added to the clinkers, the mixture is ground and sized to make portland cement.

Along with the construction of the new kiln, it was necessary to build a steel-frame boiler building connected to the feed end of the kiln. The boiler, which is fired by the exhaust gases from the kiln, provides steam for the turbogenerators of the plant. At the discharge end of the kiln another steel-frame building was built to enclose the Allis-Chalmers 4.5 × 70-foot clinker cooler. Heat is supplied to the kiln at its lower end by either natural gas or coal.

Kiln rests on four piers

The rotating kiln, supplied by Allis-Chalmers Mfg. Co., is supported by four reinforced-concrete piers varying in height from 18 to 12 feet. Each pier carries a two-wheel trunnion. The trunnion supports the rotating

(Continued on next page)



A 14-foot-high section of pier form is lowered into place over a reinforcing cage wired to dowels rising from the footing. A Sonotube split in half fashions the circular ends of this form.

(*Continued from preceding page*)

steel "tire" that encircles the kiln. The kiln is driven by a General Electric 75 to 100-hp motor that must keep the kiln rotating 24 hours a day, 7 days a week. In case there is a power failure, a Buda gasoline engine is ready to take over the job.

The design of the piers represents a departure from the type of foundations supporting the original two kilns. Instead of being a solid block, the piers of the new kiln are built with two 4-foot-thick walls supporting a 5-foot cap. The block footing is both keyed and doweled into the natural rock.

Concrete was supplied at bargain prices from the company's own concrete plant, located only a few hundred feet from the kiln. The concrete was carried by bucket on a truck to a crane. To place the concrete through the maze of reinforcing steel, a 6-inch-diameter tremie was used.

Great care was taken in placing the trunnions, which were mounted on top of the piers. In order to get the trunnions within a thousandth of a foot, the base plates were shimmed to grade and grouted in place.

Kiln erection

The kiln was erected in one 118-foot, 86-ton section and one 112-foot, 90-ton section. Each section was brought alongside the piers by the low-beds which carried them from the railhead. A P&H crane and a Northwest, both 30-ton rigs, helped shift the big cylinder from the low-beds to two timber cribs. While one 30-ton rig lifted up an end of the cylinder, a ¾-yard crane helped place the timber on one of the cribs, raising its height 2 feet. The big crane then walked to the low end of the cylinder and pulled it up 2 feet.

In this manner, the cribbing was built up alongside the piers to a height that would clear the trunnions. Using timbers to bridge across to the piers, the cranes worked the kiln sections over until they were directly above the trunnions. The kiln was not yet set on the trunnions, however, but rested on cribbing either built up from the ground or supported by the piers.

For convenience in construction, a gap of about 14 feet was left between the two kiln sections. In this position, the cranes could slip the 8½-inch-thick steel "tires" over the open ends of the two cylinders and work them into position. The tire was connected to the cylinder by means of spacer plates that were welded by a Lincoln 200-amp welding machine.

After the tires were in place, the lower section of the kiln was jacked forward to close the gap between the two sections. The sections were then welded together and the kiln lowered onto the trunnions. One of the last steps in building the kiln was lining the interior with firebrick.

Personnel

For Macdonald Engineering Co., Al Kays was the superintendent. Supervising the construction for Monarch Cement Co. was H. Fegely, vice president of operations, and Glen Shook, chief engineer. THE END

Book on how to estimate construction costs

The second edition of "Estimating Construction Costs", by R. L. Peurifoy, tells in detail how to estimate

construction costs of all kinds and describes the various methods of preparing such estimates. Production rates for labor and equipment are included, plus costs of materials, equipment, and labor for a wide variety of projects; indirect costs — insurance, taxes, bonds; a more complete coverage of Workmen's Compensation Insurance and other types of insurance.

Tables give ranges in production rates, and there is more comprehensive coverage of the building trades. New chapters cover additional equipment for and methods of drilling rock; stone masonry; and frame residences — carpentry, interior trim, and millwork.

Priced at $10.75, the book may be purchased from McGraw-Hill Book Co,. Inc., 330 W. 42nd St., New York 36, N. Y.

CRSI appoints Rice

Paul F. Rice, former technical director of the American Concrete Institute, has joined the staff of the Concrete Reinforcing Steel Institute as assistant to the managing director, Harry C. Delzell.

Prestressing Company forms new division

The San Antonio firm of Prestressing, Inc., has formed a new SPAN-BLOK Division. This division plans to license block manufacturers to make and sell a patented floor and roof system, which is composed of machine-made blocks formed into prestressed planks.

The plank incorporates a new method of grouting the contact faces between the blocks, which is said to eliminate grinding and assure positive transfer of the pretensioning force. The 16-inch-wide planks can be fabricated in 4, 6, and 8-inch depths, with roof spans ranging up to 34 feet and floor spans to 30 feet.

Harvey R. Livesay, Jr., is manager of the new division.

Revised edition of book on elementary surveying

A ninth edition of "The Principles and Practice of Surveying, Vol. 1, Elementary Surveying", by Charles B. Breed and George L. Hosmer, has been published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. In this edition, a section has been added describing types of surveys and giving sources of maps and surveying information.

The treatment of measuring distances has also been expanded and a description is given of the subtense bar. A new chapter has been added giving elements of aerial surveying and photogrammetry. The 717-page book abounds in tables, diagrams, formulas, and pictures. A list of problems and references appears at the end of each chapter.

Priced at $6.50, the book may be purchased from the publisher.

NCSA issues booklet on operating problems

"Discussion of Operating Problems", a transcript of the Operating Session of the 1958 convention of the National Crushed Stone Association, is available at $2 per copy. The booklet contains rules for measuring quarry efficiency; studies on the efficiency of quarry operations; recent trends in plant design; and timely tips on operating problems.

Copies of the booklet may be purchased from the NCSA, 1415 Elliot Place N. W., Washington 7, D. C.

Prestressed-concrete double-tee members

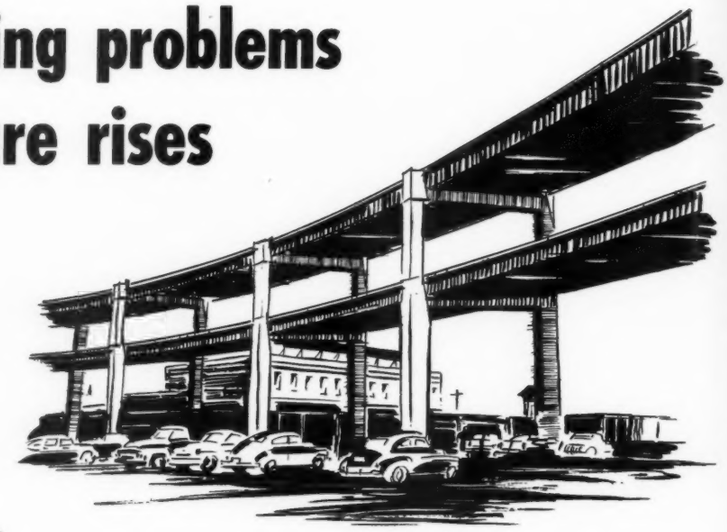
Volume 9 of its "Prestressed Concrete Design" series is now available from Leap Concrete, Inc. This handbook covers the 5-foot-wide × 19-inch-deep double-tee roof members. Data included covers safe superimposed loads in the span range of 20 feet through 61 feet, using a 7/16-inch-diameter strand with both parallel and depressed designs. A data sheet for each strand pattern gives spans, loadings, prestressing force initial prestressing force, principal concrete fiber stresses, camber, deflection, release strength of concrete, and 28-day concrete strength.

Complete technical information is given on 116 different combinations which will enable an architect or engineer to specify quickly which double-tee to use under any given condition. Also included are a section on basic design of prestressed concrete and a table of loadings for nine other prestressed structural members, such as the channel and keystone joist. The book abounds in diagrams.

Priced at $2, the handbook may be purchased from the company, P. O. Box 1053, Lakeland, Fla.

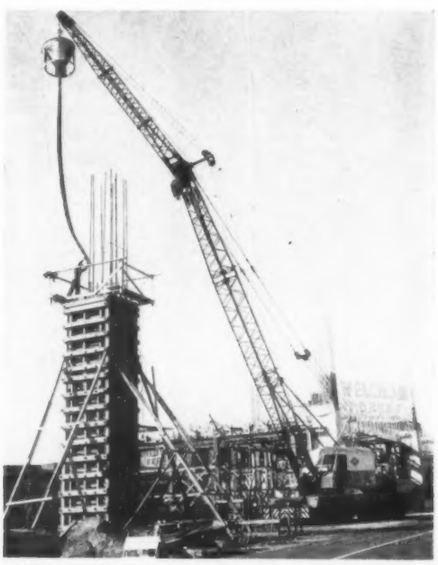
Crews meet changing problems as freeway structure rises

by RALPH MONSON, field editor



The still unfinished double-deck Embarcadero Freeway runs 1.2 miles along the congested San Francisco waterfront to connect with approaches to the San Francisco–Oakland Bay Bridge. Throughout construction, local traffic had to continue using the existing roads bridged by the structure, and a rail line under the elevated freeway had to be in use. Different problems cropped up as every new stage of the work was reached. Here's the way they were met . . .

At the start, layers of paving and sidewalk make pile driving for the pier footings difficult. Quiet Myrt, right, a skid rig with 90-foot leads, and Silent Sue, a converted Marion steam shovel, handle the work.



A Gar-Bro 1-yard bucket with a long Gar-Bro rubber tremie is used by a Lima 60-ton crane to get transit-mix concrete to forms for a column. The rig's 70-foot boom and 30-foot jib made it possible to use this method to cast columns to lower-deck level.

Using a system of tubular-steel scaffolding that was fabricated in its own shops, Charles L. Harney, Inc., general contractor for the Embarcadero Freeway in San Francisco overcame a number of difficult shoring and forming problems.

Building the double-deck elevated highway down the middle of a busy street in the heart of a city is an extremely complicated job at the best. When a railroad that runs down the center of the street has to be kept in operation throughout the construction period, the complications, and especially shoring problems, increase.

Harney has not only met these and many other problems, but has planned and conducted the job so well that it is ahead of schedule and will probably be completed well before the July, 1959, contract deadline.

The freeway, being constructed under a $7.5 million contract with the California Division of Highways, connects with the approaches to the San Francisco-Oakland Bay Bridge on the south and carries traffic northerly about 1.2 miles along the busy San Francisco waterfront. On and off ramps at Broadway now mark the end of the structure, but there is provision for future extension of this freeway toward the Golden Gate Bridge.

The freeway is a two-level structure carrying the northbound traffic on the lower deck and southbound traffic on the upper level. The original street, retained for local traffic, is obstructed only by the columns supporting the structure.

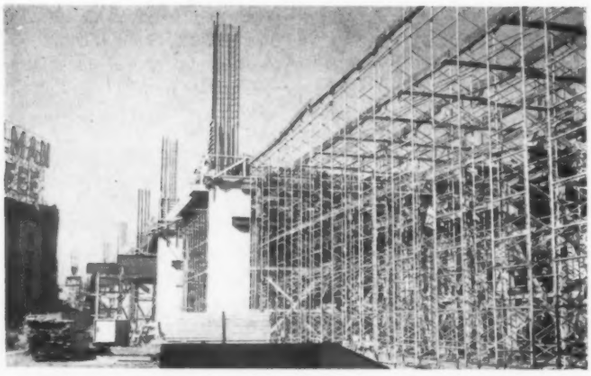
Since a railroad serving the docks and adjacent warehouse area runs at ground level under the structure, the first deck has to be high enough to provide a minimum 23½ feet of clearance above the rails. The second deck has a 15-foot minimum clearance above the first to accommodate trucks and trailers.

Decks are box girders

Structurally, each deck is a heavy box girder spanning an average of about 85 feet between piers. Most of the piers have two columns from the ground to the first deck, with a heavy cap spanning between the columns to support the box girders. The exterior columns continue on up to support a second cap and the box girders of the second deck.

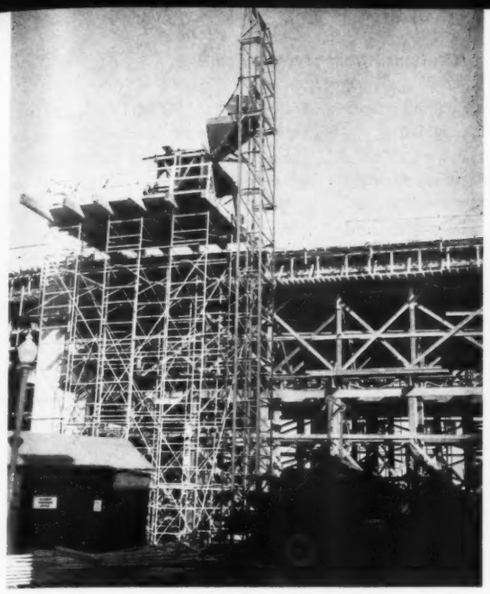
While ramps make for many variations of cross section, the typical section has a 52-foot-wide four-lane roadway with a 2-foot-wide raised curb and railing section on each side. Columns are outside this section.

Supporting the pier footings are

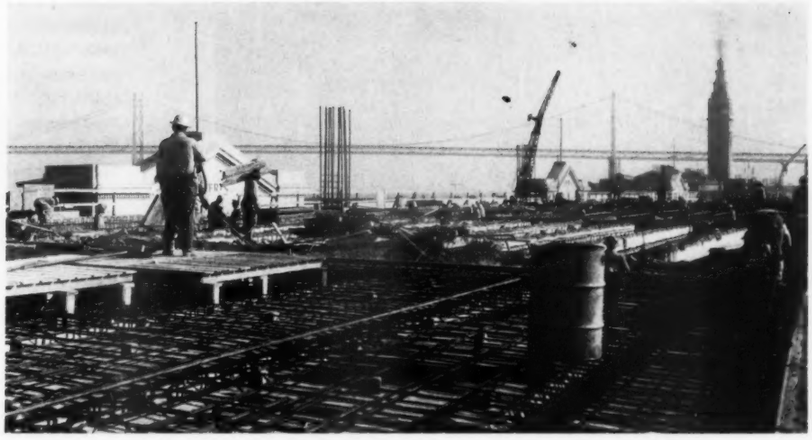


A scaffolding system, devised by Charles L. Harney, Inc., supports lower-deck forms. The 6 × 12 stringers are in place on brackets on the top jacks of the scaffold. On these are 2 × 6 joists to support plywood decking.

Heavy steel beams spanning the railroad under the structure support the forms and also provide clearance for trains serving the dock area. This same method was used to bridge intersecting streets.



Though a truck crane lifted concrete to a hopper for all large pours on the lower deck, concrete for small pours was handled by this Wagner Mixermobile and tower.



The bottom deck stands ready for concrete after the lost soffit form and reinforcing are placed. Just beyond, crews form stem walls. In the background is the San Francisco-Oakland Bay Bridge and the tower of the Ferry Building, a well known Frisco landmark.

more than 160,000 linear feet of steel H-piles, most of which are 14-inch, 102-pound piles ranging up to 235 feet in length. Individual footings have 10 or 11 piles, each driven to 125 tons bearing in a dense sand and gravel stratum deep underground.

Most other structures in the area are founded on gravel strata at a somewhat higher elevation, but many of these have been settling. To avoid the possibility of settlement with the extremely heavy pier loadings of this structure, the contractor pushed piles down through the first gravel bed, then through strata of dense blue clay to the more secure footing of a sand and gravel bed which overlays bedrock.

Concrete footings about 7 feet below street level cap the piles and support the big columns of the structure. These columns measure 4.5×6 feet in cross section up to the first deck, and step down to 4.5×4 feet between the first and second decks. Most of the caps spanning between the columns at the first deck level are 4.5 feet wide and 9 feet deep. For the second deck, they measure 4 feet wide and 8.5 to 9.5 feet deep, and some of them span as much as 80 feet at ramp entrances.

Some of the exceptionally long top-deck caps are prestressed. (See "Integral Pier Caps Are Post-Tensioned", page 52, for details of the post-tensioning operation.)

The box-girder section is continuous from hinge to hinge over several piers. In typical cross section, the box girders are 4.5 feet high with a 5½-inch bottom slab and a 6⅝-inch top slab. Longitudinal stem walls joining the top and bottom slabs are spaced about 7.75 feet apart and are 8 inches thick near the center of the span. These stem walls flare out as they approach the pier caps. There are also internal transverse diaphragm walls.

This is a typical design being used by the California Division of Highways for elevated freeways and cast-in-place grade-separation structures. It combines some structural advantages with a pleasing appearance.

Hard driving

Using a Gradall, the contractor excavated five to seven feet below street level for the column footings. This was anything but easy digging, for old pavements, sidewalks, and other structures in the area had settled and new ones were built over them. The remains of many of these old structures were uncovered in digging the holes. Many of these old struc-

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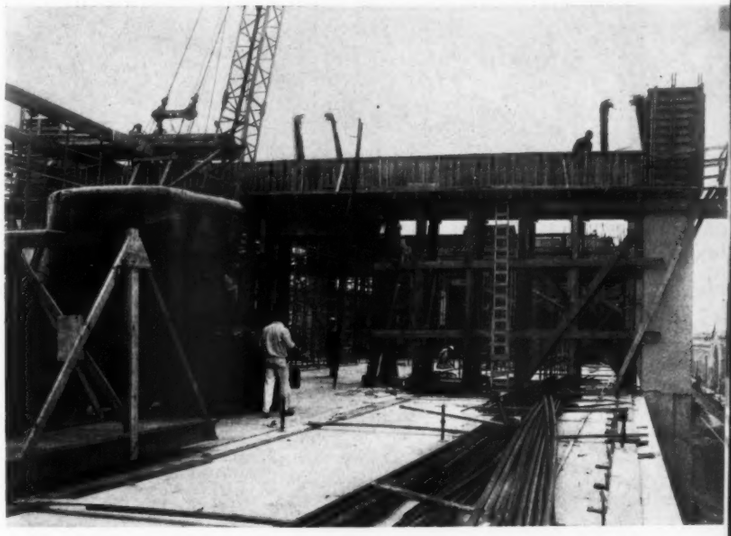
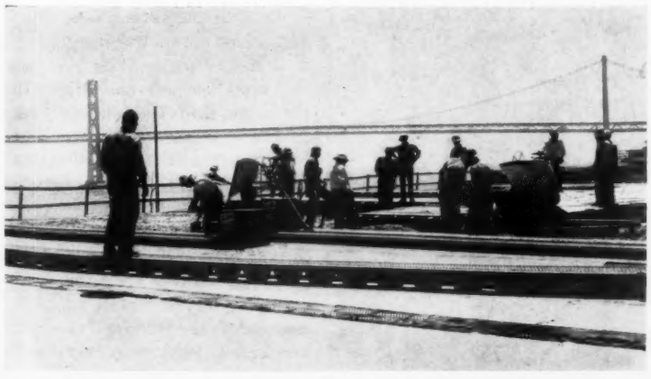
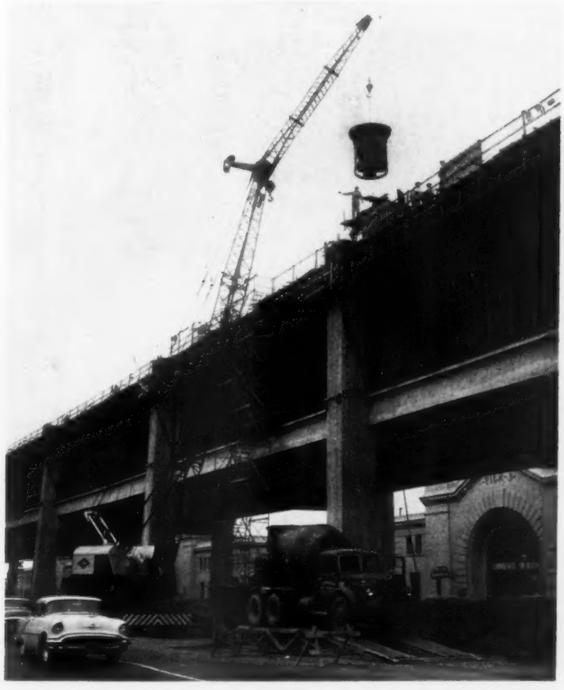


When pier caps for the second deck were started, moving materials on the deck threatened to become a problem. A 10-foot-wide aisle in the shoring made it possible to move even this P&H 10-ton crane.



As the Cmetco buggies dump concrete to the form, the mix is consolidated by Homelite vibrators and finished by Clary screeds. Installation of guardrail and a lighting system will complete the work.



The big Lima hoists all concrete to the hopper during pours for the second deck. The Mack truck with Cal-Rex transit mixer keeps the crane supplied. The stairway tower provides access to the deck.

(Continued from preceding page)

A Gradall handles the tough job of excavating for the column footings. Excavation was carried from five to seven feet below street level, through layers of pavement and sidewalk that had settled and been covered with new ones through the years.

tures were encountered at even deeper levels when pile driving started.

Macco Corp., Paramount, Calif., subbed the pile driving and drove most of the piles with two rigs affectionately named Silent Sue and Quiet Myrt. Their mellow voices were soon recognized by all who lived within a radius of a mile or more of the project.

Silent Sue is an old Marion steam shovel converted to a pile driver. Her 65-foot boom handled 60-foot fixed leads on this work, and her 140-hp oil-burning boiler supplied steam for pile driving as well as for operating the rig.

Quiet Myrt is a skid rig built by Macco. She has a 50-hp oil-burning boiler and mounts 90-foot leads. Both rigs drove the big H-piles with single-acting 5-ton steam hammers that develop 32,500 foot-pounds per blow.

Before piles were driven, Quiet Myrt punched a hole through the old concrete and other underground debris with a heavy steel spud. This is a 14-inch beam heavily reinforced and built up to stand the hard driving. It is 36 feet long and is usually driven most of that depth. Quiet Myrt then pulled the spud with an extractor so that the first section of the pile could be set.

Since the piles range from 135 to 235 feet in length, it was necessary to make one or two splices in the leads as each pile was driven. After getting through the old debris, the piles drove quite easily through a varying depth of bay mud to the first gravel layer. Here the driving became more difficult. In fact, though the desired bearing could be developed on most of the piles in this layer, they were carried on down to eliminate the possibility of settlement.

Below the first gravel layer, the piles drove slowly but steadily through dense blue clay to final firm bearing in the very dense layer of sand and gravel overlaying bedrock.

Columns and footings

When the piles were driven to bearing and cut off to grade, the concrete footings were poured directly from the transit mixers.

Columns were formed and cast from the footings up to the level of the lower deck caps in a single unit. The combination wood and metal column forms were braced with 4×4 wales and tied through with shebolts.

To pour these high columns, Harney took advantage of a big 60-ton truck crane on the job. A 70-foot boom and 30-foot jib gives this rig a good high reach. A long rubber tremie attached to a 1-yard concrete bucket was used to place concrete for the bottoms of the columns. This meant that the crane had to lift the bucket practically twice the height of the column in order to get the tremie started into the top of the form. Transit-mix concrete for the columns, as well as all other parts of the structure, is being supplied by Consumer's Rock & Cement Co.

Tubular-steel shoring

While the pile drivers were still at work on some of the footings, Harney's crews began building the pier caps and the lower-deck box girder. The contractor, with experience on similar structures, has developed a system of tubular-steel scaffolding well adapted to this type of work. The components were fabricated in his shop.

Square steel base plates were welded to the lower jack screws which support each scaffold tower leg. These plates were nailed in place on wooden sills laid on the old street pavement. The scaffold towers were then assembled in place, section by section. The vertical sections simply fit together with sleeves. Diagonal braces fit over

Equipment at work early on the Embarcadero Freeway project included a Warner & Swasey Gradall for excavating column footings and two pile drivers using McKiernan-Terry S-10 single-acting steam hammers. One was the Silent Sue, an old Marion steam shovel converted to a pile driver. The other, a skid rig, also used a McKiernan-Terry No. 4 extractor for pulling the spud used to start holes for piles.

Equipment used in setting scaffolding and in forming included P&H and Michigan 10-ton cranes, a Clark Clarklift, a Remington stud gun, and Plycrate, a form of plywood.

Among concrete-placing equipment were a Lima 60-ton truck with 70-foot boom and 30-foot jib; Gar-Bro 1 and 2½-yard buckets, tremie, and concrete hopper; Cal-Rex mixers mounted on Mack trucks; and a Wagner Mixermobile. Cmetco power buggies and Clary power screeds were also on the job, and vibrators included rented sets of Homelite units with generators.

pins on the vertical sections and are held in place with cotter keys. A small crew using 10-ton motor cranes sets the scaffolding rapidly.

A screw jack in the top of each tower leg carries a channel-shaped bracket which supports the 6 × 12 stringers on which the deck form is built. These stringers fall directly under the box girder's longitudinal stem walls, where the maximum load is concentrated. Across the stringers, 2 × 6 joists at one-foot centers support the ⅝-inch Plyform decking for the lower slab of the box girder.

The jack screws in the top and bottom of each leg make it easy to plumb the towers and to bring the deck forms to exact grade.

This forming is relatively simple and would have been very fast to set and strip, but complicating factors were many. Each pier cap being formed had to have heavy shoring to support the huge volume of concrete concentrated in the cap. In most cases, 8 × 8 wood posts with 6 × 12 stringers supported the cap forms, with steel beams being used to span across roadways and railroad tracks.

Shoring of the lower deck was made particularly difficult by a railroad. At the beginning of the project, 5,570 linear feet of track had been relocated to give adequate clearances from the piers of the structure. The main line runs under the elevated highway for about half of the structure's length.

The deck shoring had to provide enough clearance so that the railroad could operate continuously during construction. This meant that a great many heavy steel beams had to be erected on big timber supports spanning the tracks. A similar system spanned intersecting streets.

Forming box girders

With the shoring and deck in place, the forms for the exterior walls of the box girder were erected and braced from the outside. At the outside of this form, a walkway with railing protected workmen from falling. Reinforcing for the bottom slab and the stem walls was then set in place. Richards Reinforcing, Oakland, Calif., is placing all reinforcing on the job.

Stem-wall forms, made of plywood backed with 2 × 4's, were set up on precast-concrete blocks the depth of the bottom slab and tied with snap ties. When runways for the concrete buggies were set in the spaces between the stem walls, the section was ready

(Continued on next page)

Early in the job, this International tractor with overhead boom attachment put down wood sheeting for the footing holes with a pneumatic sheeting driver. Air for the driver is supplied by a Schramm compressor.

(Continued from preceding page)

On the deck, a Cmetco power buggy picks up a load of concrete from the Gar-Bro double-gated hopper. A fleet of seven of these motorized buggies kept shuttling between the hopper and the point of placement to keep crews supplied with concrete.

for the first concrete pour.

Since the deck is continuous over several piers, this entire length—ranging from 300 to 400 feet—was formed and poured as a unit.

Concrete placement

On some of the pours for the first deck, the concrete was hoisted by two Mixermobiles with high towers. The ready-mix trucks dumped into the skips of the Mixermobiles and the mix was fed through the drum to the tower bucket and carried up to the deck. A 4-yard double-gated hopper at the deck level served as a surge bin for the buggies.

On large pours, this method was augmented by the truck crane which was used to pour columns. This rig bucketed concrete directly to the first deck forms in 2½-yard buckets. On the later pours on the first deck, as well as all pours for the second deck, the big motor crane was used to raise all of the concrete directly to the hopper.

Bottom slabs and stem walls are poured from hand-powered buggies, as are some of the top slabs. Most of the concrete for the second-deck top slab is being transported from the hopper to the forms by a fleet of seven power buggies.

Several types of vibrators are used on the work, but the contractor is finding it advantageous to rent Homelite generator and vibrator sets with the owner providing the maintenance. Three of these generators and six vibrators are usually on the job.

Lost soffit forms

To form for the top slab, it is necessary to place a form in the area between the stem walls. Since there is no access to this area once the top slab is placed and this form cannot be recovered, it is referred to as the lost soffit form.

Harney developed a simple lost soffit form, using the cheapest available 2 × 4's and an inexpensive ⅜-inch plywood. The workmen first nail a 2 × 4 ledger to the stem-wall concrete, using a stud gun with 22-caliber loads and ⅛-inch studs. Spanning between these ledgers are 2 × 4 joists supported at the center by shoring posts that reach down to the lower slab. The light decking is held down with just enough nails to keep it in place.

Concrete for the top slab, placed with hand or power buggies, was screeded with power screeds and finished by hand.

Second-deck shoring

With the first deck completed, the second-deck columns are formed and poured up to the level of the bottom of the caps. Then comes the job of shoring and forming the second deck. Here, railroads and street intersections give no problem, but shoring and forming material have to be moved ahead on the first deck through a sec-

As forms are stripped, materials are piled by type and made ready for transport ahead. This Clark truck is loading a stack of plywood onto a trailer; in the background, a workman is tying up a bundle of 2 × 6 joists.

tion that is being built or cured.

One alternative would have been to lower the materials to the ground, transport them ahead, and then raise them again at the new location. Harney figured out a faster and cheaper way.

The tubular steel shoring is used to shore the second deck from the finished first deck. In setting the shores, a 10-foot-wide aisle is left open down the center of the structure. Steel beams span across this opening, leaving an aisle through the entire length of the shoring.

As a section at the rear is stripped, the workmen put the several types of materials into separate piles or containers. As the shoring towers are dismantled, each of the components fits into specially designed racks or boxes. Everything is placed on pallets so that it can be handled by a lift truck.

A small fork truck loads piles of the plywood, lumber, timbers, steel beams, and scaffold components onto small rubber-tire trailers. The fork-lift then hooks onto the trailers and pulls them through the open aisle to the advance area for reassembly.

Here, a small truck crane raises the various elements of the shoring and forming into place as they are reassembled. Since this little 10-ton motor crane can get through the 10-foot aisle, it can travel in either direction on the lower deck, if necessary.

The concrete-placing operation for the top deck is similar to that for the lower deck, but all the concrete is being hoisted to the hopper by the 60-ton motor crane in the 2½-yard buckets.

The form system, designed for fast and easy erection, is also easy and fast to strip. Workman first break loose the lower jacking nuts of the shoring towers just to be sure they are not locked. Then they lower the top jacking nuts enough to take out the 6 × 12 stringers under one edge of a form section.

Using a special twisting tool, they next tip the 2 × 6 joists to free them. As these 2 × 6's are pulled out, the plywood decking sections come free. The workmen drop them down onto the first cross brace of the shoring tower where they become a working scaffold for the men doing the stripping.

The plywood is left here long enough for finishers to follow along and do any necessary finishing to the underside of the deck. In most instances, this is simply the removal of a few small fins which form between the sheets of plywood.

When the finishers are through, the plywood is lowered to the deck and stacked so that it is ready to be moved ahead. The towers are dismantled, piece by piece, with each component going into the rack or box in which it is moved ahead.

A total of some 41,000 cubic yards of structural concrete and 13 million pounds of reinforcing steel is going into the structure. The job also includes an extensive lighting system and 18,000 linear feet of guardrail.

Overseeing the job for Charles L. Harney, Inc., is project manager Jim Ahern. Job superintendent is Robert V. Waylett. Supervising the pile driving for Macco Corp. were Woodrow W. Grimland and Stan Tremble.

Representing the California Division of Highways on the project are resident engineer D. R. "Don" Higgins and assistant resident engineers George Low and Linn Ferguson. Higgins is also serving as area supervisor over three other freeway projects in the vicinity.

The project is being handled by the Bridge Department, Division of Highways, under F. W. Panhorst, bridge engineer. State highway engineer and chief of the Division of Highways is G. T. McCoy. THE END

Steel H-piles that support the footings of the structure are taken from a stockpile by this Garlinger fork-lift and delivered to the pile drivers. Some of the columns are at left.

"These machines may look alike but there's **A BIG DIFFERENCE** *in their performance"*

"Our new model H-70 'PAYLOADER' may appear similar to its predecessor, the model HH, but that's where the comparison ends," says G. A. Gilbertson, President of The Frank G. Hough Co.

"Our program of continuous research and product betterment has made possible a number of improvements that make the model H-70 far superior in performance. These changes and what they mean in terms of improved tractor-shovel performance and satisfaction are pointed out in the following paragraphs."

9-B-1

Greater power

New and more powerful engines, both gasoline and diesel, give you reliable power and plenty of reserve power. Diesel engines are available in either 2 or 4 cycle types.

More traction

New, better weight distribution with 1500 pounds more weight on the rear wheels provides more useable traction at all times — gives more push for greater digging power, better climbing ability and surer footing on mud, snow and ice.

Stronger throughout

Many components have been made stronger than ever, including main frame, boom arms and bucket linkage. The new front axle assembly is 40% stronger and the rear (steering) axle assembly is 80% stronger. These axles are wider and increase the side stability of the model H-70. They also include larger main shafts and heavy duty planetary final drives in the wheel hubs.

Greater protection

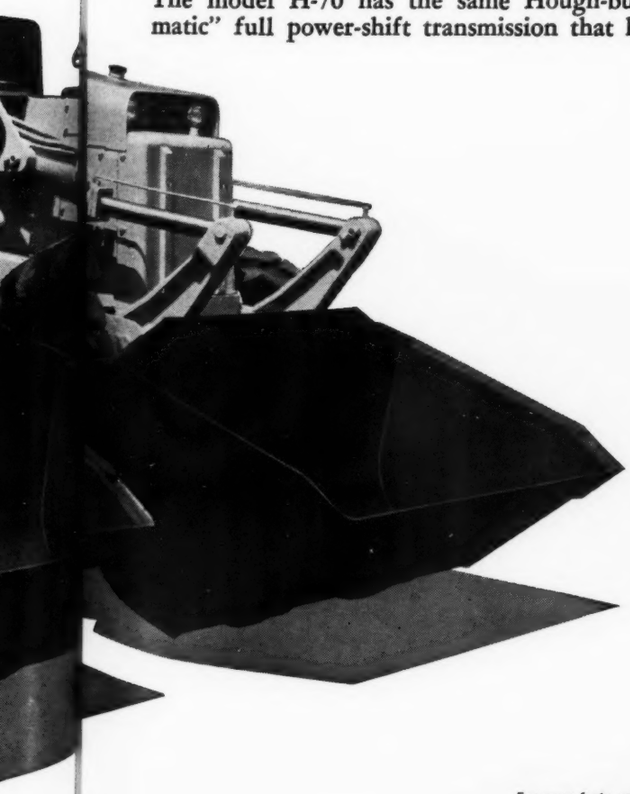
To assure fullest protection of the engine when operating in dusty conditions, the H-70 uses a triple air cleaner system consisting of a precleaner and two oil-bath air cleaners. A cartridge-type oil filter is built into the hydraulic reservoir. Similar filters also protect the engine oil and the transmission-torque converter oil. The front service brakes are sealed to keep out dust and dirt.

Larger, more efficient torque-converter

The torque-converter in the model H-70 is larger with ample capacity for the job and closely matched to the engine and transmission characteristics. It is the efficient two-phase type with a high torque-multiplication factor (stall ratio) of 2.72 to 1.

"Paylomatic" power-shift transmission

The model H-70 has the same Hough-built "Paylomatic" full power-shift transmission that has demonstrated its superiority on the model HH. With 3 speeds in each direction, it provides low powerful digging speeds plus high forward and reverse travel speeds up to 26 mph. Finger-tip shifting up or down in either direction without "clutching" or stopping for a range shift, speeds operating cycles on any job.



Power-transfer differentials

The use of power-transfer differentials as standard equipment on both front and rear axle assemblies continues with this model H-70. These special differentials insure reliable traction on mud, ice and similar conditions by transferring more power to the drive wheels with the best footing when slippage is encountered.

What about rated capacity?

This model H-70 like all other "PAYLOADER" models is rated, not by "Bucket Size" or "Lifting Capacity", but by *Carry Capacity* — the pounds of material that can actually be carried in the bucket at speeds up to 4 miles per hour. The Carry Capacity of this "PAYLOADER" is 7,000 lbs. and you will note that the "70" in the model H-70 designation indicates it's 7,000 lb. Carry Capacity.

Knowing the Carry Capacity is 7,000 lb., you can select the bucket you need from the many sizes available (from 1 cu. yd. to 2¾ cu. yd.) depending on the specific weight of the heaviest material you want to handle.

For example, a 2 cu. yd. bucket for handling materials weighing up to 3,500 lbs. per cu. yd. (2 x 3,500 = 7,000 lb.). Insist on knowing the Carry Capacity of the tractor-shovel you buy. "Lifting Capacity" — what it will lift standing still — and "Bucket Capacity" are not enough.

Powerful pry-out bucket action

The model H-70 has the famous pry-out bucket action that distinguishes "PAYLOADER" units from all other tractor-shovels in both looks and performance. Your Hough Distributor would like you to prove to yourself that the model H-70 will out-produce any tractor-shovel near its size. Ask him for a demonstration, and you be the judge. The Frank G. Hough Co., 762 Sunnyside Ave., Libertyville, Ill.

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LIBERTYVILLE, ILLINOIS

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For more facts, use Request Card at page 18 and circle No. 210

Names in the news

Francis S. Friel, president of the American Society of Civil Engineers.

ASCE elects president

Francis S. Friel has been elected president of the American Society of Civil Engineers. A former vice president of the organization, Friel is president of Albright & Friel, Inc., Philadelphia, a firm doing design and construction supervision on sanitary engineering and other projects.

Friel heads the U. S. Executive Committee, and is a past president of the American Institute of Consulting Engineers and the Federation of Sewage & Industrial Wastes Association.

Dravo promotes Thompson

Robert A. Thompson has been named assistant operations manager of the Contracting Division, Dravo Corp., Pittsburgh. Prior to his new position, he served as a field superintendent, and most recently supervised all construction on the Taconite Harbor project for Erie Mining Co.

Ebasco promotes Hall

Marvin F. Hall has been promoted to consulting gas engineer by Ebasco Services, Inc., New York City, engineering, construction, and business consulting firm. Hall has handled assignments including studies of future supplies of natural gas and crude oil reserves; of gas engineering practice and economic feasibility of natural gas pipelines; and of propane gas storage problems in Canada.

Corps assigns new chief to South Pacific Division

Brig. Gen. Robert G. MacDonnell has been assigned as division engineer of the South Pacific Division of the U. S. Army Corps of Engineers. Gen.

Brig. Gen. Robert G. MacDonnell, division engineer for the South Pacific Division of the Corps of Engineers.

MacDonnell will direct a $240 million construction program, which includes flood-control and navigation projects, as well as military construction, in California, Arizona, Nevada, Utah, and portions of bordering states.

Gen. MacDonnell, who succeeds Brig. Gen. William F. Cassidy, was formerly assistant commandant at The Engineer School, Fort Belvoir, Va.

Asphalt Institute names paving, district engineers

Paul S. Wright has been appointed commercial paving engineer for the Pacific Coast Division of The Asphalt Institute. An expert in the fields of soil testing, design and control of asphalt mixtures, and paving, Wright was formerly chief field engineer for the City of Los Angeles and served in its Department of Public Works for 34 years.

At the same time, the institute promoted district engineer Vaughn Marker to division paving engineer. He will continue to work from the division headquarters in San Francisco, but will direct paving advisory work throughout the division's territory—Washington, Oregon, California, and Arizona.

Two district engineers have been named by the institute. Allison D. Hill, a 26-year veteran design, construction, and materials engineer with the Kansas State Highway Commission, fills the Illinois post. Earl G. Angell takes over the post for Minnesota and Iowa.

ABTTA elects to board

John S. Stillman has been elected a member of the board of directors of the American Bridge, Tunnel and Turnpike Association, Inc. Stillman, chairman of the New York State Bridge Authority, is chairman of the association's committee on bridge administration, and also served on the committee which prepared testimony for a Congressional hearing concerning the impact of the interstate highway program on existing and future toll facilities.

New Orleans Port names planning coordinator

Col. William H. Lewis (U. S. A., ret.) has been appointed planning coordinator for the Port of New Orleans. In this post, Col. Lewis has charge of all planning and development of facilities, as well as of all activities of the Port Commission involved in the construction and development of the Mississippi River-Gulf outlet.

He is also responsible for the preparation, adoption, and execution of a $120 million port improvement and

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expansion program, scheduled for completion in 1970.

Col. Lewis was formerly district engineer in New Orleans for the U. S. Army Corps of Engineers, supervising investigations, planning, construction, and maintenance work valued at $119 million.

NSPE votes Dunn president and presents award

Dr. Clark A. Dunn has been elected president of the National Society of Professional Engineers, succeeding Garvin H. Dyer. Dr. Dunn is a professor of civil engineering and executive director of the office of engineering research at Oklahoma State University.

Six regional vice presidents were also elected: Harold A. Mosher, Northeastern Region; John B. McGaughy, Southeastern; L. E. Easley, Central; W. L. Hindermann, North Central; L. R. Durkee, Western; and Noah E. Hull, Southwestern. Russell B. Allen was elected for his eleventh term as treasurer.

At the annual meeting also, Nathan W. Dougherty, dean emeritus of the University of Tennessee, received the society's 1958 award. The annual award is made in recognition of leadership in the profession.

O'Farrill Award given to Thailand engineer

Federal Highway Administrator Bertram D. Tallamy presented the O'Farrill Highway Award to Sirilak Chandrangsu of Thailand, one of 42 foreign highway engineers from 34 countries who just completed a year of graduate studies in the United States under the auspices of the International Road Federation.

The award is presented each year to an outstanding student taking advanced studies on an IRF fellowship. It is named in honor of Romulo O'Farrill, president of the Mexican Highway Association.

Highway engineers named

Five engineers have been appointed by the Pennsylvania Department of Highways. Francis H. Gilroy is bridge design engineer 2 in the central office at Harrisburg; Raymond E. Lintner, highway design engineer 1, and Panayotis Vrettacos, civil engineer 1, District 11 office, Pittsburgh; Leonard P. Moore, civil engineer 1, District 2 office, Clearfield; and Thomas W. Lyons, Jr., civil engineer 1, District 12, Uniontown.

BRI re-elects Topping

The Building Research Institute has re-elected Charles H. Topping and Harold L. Humes president and vice president, respectively. Five new members were appointed to the 28-man board of governors: F. J. Close, Leon Chatelain, George S. Goodyear, Mason G. Lockwood, and James R. Price. Four men were reappointed to serve additional 3-year board terms: C. P. Bobe, John F. Hennessy, Otto Nelson, Jr., and C. H. Topping.

New York Trap Rock officer becomes board member

John R. Kringel, vice president of production of the New York Trap Rock Corp., West Nyack, N. Y., has been named to the firm's board of directors. Kringel joined Trap Rock in 1954 as superintendent of the Haverstraw plant, became assistant vice president of production two years later, and vice president in April of this year.

Engineering firm elects

Joseph M. DeSalvo, chief engineer of Joseph S. Ward, Inc., consulting soil and foundation engineers of Caldwell, N. J., has been elected vice president of the company.

Construction firm wins safety award

Joseph P. Blitz, president of the New York City construction firm of J. P. Blitz, Inc., was presented with the Employers Mutuals of Wausau's top safety award for his firm's safety record as general contractor on the Morningside Gardens housing project in New York. Dale Snure, resident vice president of the organization's New York branch, made the presentation at a luncheon given in honor of the occasion.

Steinman establishes student-aid scholarships

Dr. David B. Steinman has made a grant of $10,000 to St. Lawrence University to establish Holton D. Robinson scholarships for student aid, in memory of his late partner, Dr. Robinson, an alumnus of the university. The grant, made from the funds of the David B. Steinman Foundation, specifies that each student who receives a scholarship should be asked to assume a moral obligation to repay the university when he can, in order to help make the fund self-perpetuating.

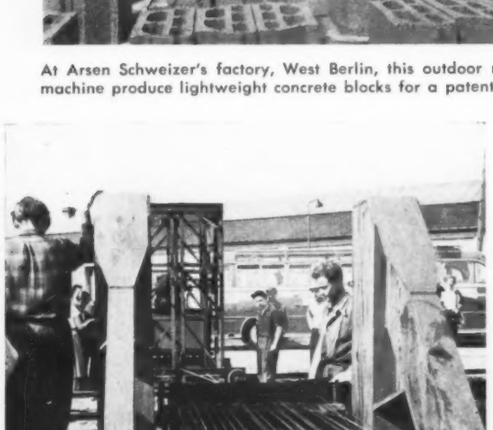
C. H. Gronquist, associate engineer at the Steinman firm, has received an honorary degree of Doctor of Science from his alma mater, Rutgers University, New Brunswick, N. J. The degree was conferred in recognition of his work on the design and supervision of construction of many major bridges in the United States.

Europe builds

Precast, prestressed elements push poured-in-place construction as economical technique; Germany, Sweden, and Denmark demonstrate progress

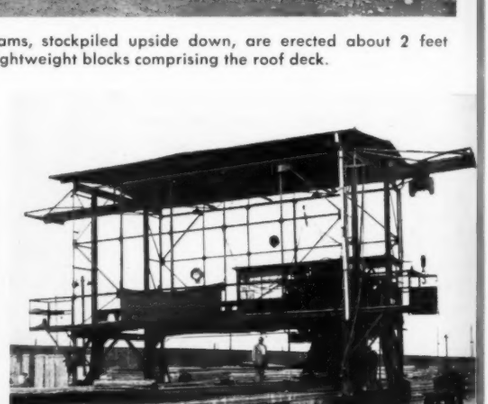
At Arsen Schweizer's factory, West Berlin, this outdoor mix plant and block machine produce lightweight concrete blocks for a patented roof deck.

These prestressed beams, stockpiled upside down, are erected about 2 feet apart to support the lightweight blocks comprising the roof deck.



At the Grünau prestressing yard, East Berlin, wires are pretensioned at the live end of this 820-foot bed for the casting of building panels.

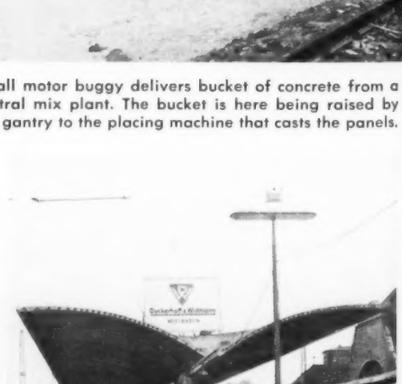
After the wires have been firmly secured, a workman snips off the overhang from the reel. Panels are cast sandwich fashion, one over the other.



Small motor buggy delivers bucket of concrete from a central mix plant. The bucket is here being raised by the gantry to the placing machine that casts the panels.

Typical silhouette against a Berlin sky these days is the big revolving crane. This rig is helping to erect a precast concrete building just off the Kurfurstendamm.

One of West Germany's biggest block producers is Trassswerke Meurin at Andernach/Rhine. Blocks flow out from the plant in a steady stream for outdoor stockpiling.



Platform roof of prestressed shell construction at the Koblenz station. Contractor Dyckerhoff & Widmann used the Dywidag prestressing system.

with concrete

by WILLIAM H. QUIRK
editor

With Berlin the setting this year for the Third International Prestressed Concrete Congress (see page 58), considerable interest has been aroused in European techniques and developments in both precast and prestressed concrete.

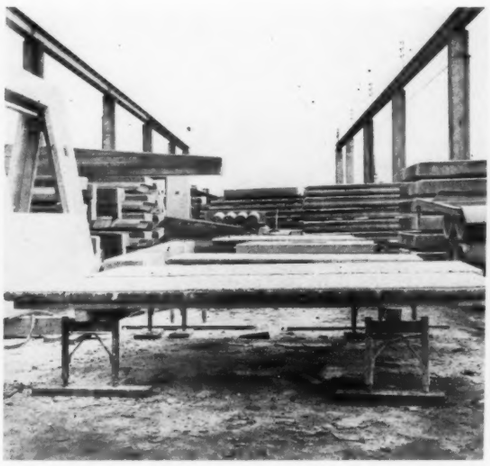
It is obviously impossible to report in an article or two on the progress an entire continent is making in this particular phase of construction activity. But after visits to concrete plants and projects in half a dozen or so northern European countries, a pattern emerges indicating that concrete is not only the prime building material in use, but also that it is most adaptable to the current economic climate.

In the past, concrete has chiefly been fashioned into functional shapes through on-the-job pours done by contracting organizations. There is still plenty of this type of construction going on, and no doubt there always will be. But considerably more concrete each year is being precast in what are generally called factories or plants.

These production centers may be completely enclosed, or they may con-

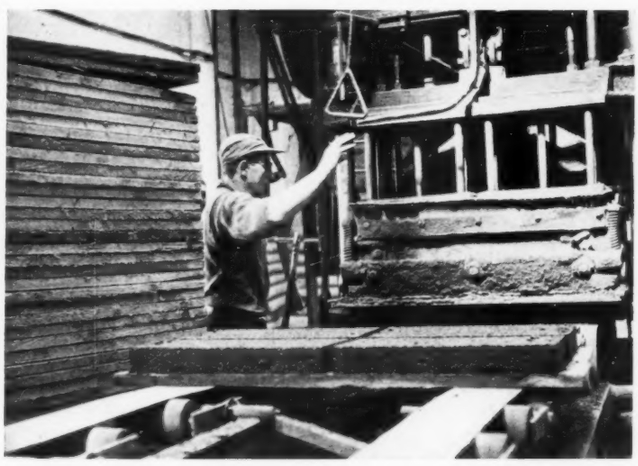
(*Continued on next page*)

At the Swedish plant of AB S:t Eriks Fabriker, a Fejmert horizontal, turbine-type mixer discharges concrete to a buggy that feeds an automatic slab paver. Slabs are for walks and driveways.

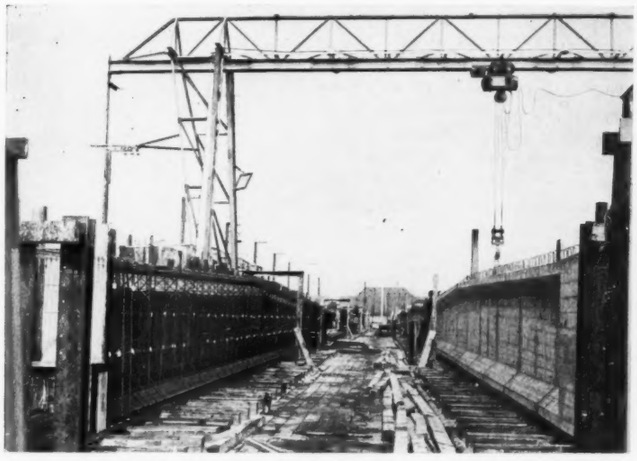


A specialty of Skanska Cementgjuteriet, Swedish producer, is the exterior wall panel with the harsh exposed aggregate for the outer face. The building products firm is 70 years old.

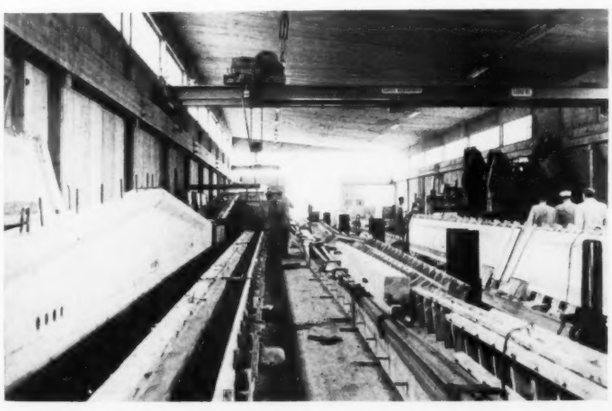
One of the longest set of interior prestressing beds is in the Stockholm factory of AB Strangbetong. These beds are 279 feet long.



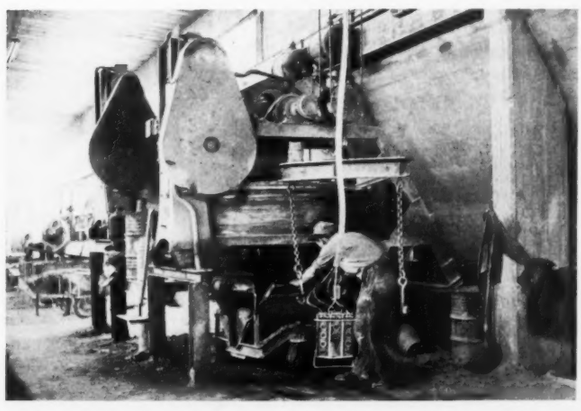
Leca blocks are mass-produced in Copenhagen at the plant of Lemvigh-Muller & Munck A/S. The lightweight blocks are cured with low-pressure steam.



Larsen & Nielsen, a contracting firm, operates this outdoor prestressing yard at Glostrup, Denmark. The 80-foot beams are cast for use in an industrial building.



In K. Hindhede's prestressing plant at Roskilde, Denmark, the overhead gantry delivers a bucket of concrete to a beam form. The hall accommodates six beds having a length of 60 meters (197 feet).



Midway along a side wall of the Roskilde plant are twin horizontal-type mixers that discharge concrete into buckets. A hand-operated hoist, mounted on an overhead gantry, takes concrete to the work in progress.

At the Grünau plant in East Berlin, a 2-man crew casts reinforced-concrete railroad sleepers, using a dry mix and a steel form with external vibrator.

sist of a combination of inside and outside work areas. They may be owned and operated by large industrial concerns; by smaller operators such as local contractors-turned-producers; or even by states themselves, as done in the U.S.S.R., East Germany, and Poland. A film that the Soviet Union showed at the Prestressed Congress revealed large-size concrete elements being precast and prestressed in a factory that resembled a modern steel mill, with its gigantic machinery for stressing the wires and handling the finished products.

In this installment on European concrete construction, some highlights of work in Germany, Sweden, and Denmark are presented. Concrete activities in Great Britain, France, The Netherlands, and Poland will be discussed in coming issues.

West Berlin

Heavily damaged Berlin, now a divided city, furnishes countless examples of concrete construction, especially in the western sector where rebuilding has progressed at a rapid rate over the past eight years. From the end of the war until 1950, building materials were difficult to obtain. But with the help of the European Recovery Plan, progress has been rapid in reconstruction, especially in the past few years. Economy and the utmost exploitation of building materials have been prime considerations in the work.

In Berlin alone, 32 bridges to replace destroyed spans have been built of prestressed-concrete or composite construction. Grade-separation structures for new express highways are also going up with prestressed elements. Underpinning buildings in connection with the new subway is being done with prestressed beams. And prestressed-concrete sleepers are being laid for the tracks of the new underground railway. Commercial buildings and housing projects are erected with blocks and panels of lighter concrete sections, and with beams and trusses that are prestressed. Tanks, coke ovens, reservoirs, race tracks, gymnasiums, and auditoriums are also examples of prestressed construction. Congress Hall (see page 63) with its doubly curved suspension roof is an illustration of the fact that architectural beauty need not be sacrificed with this type of construction.

Berlin is a ready market, then, for concrete building materials. Helping to supply that market is the firm of Engel & Leonhardt, in business since 1927, with three plants in West Berlin employing 160 persons to turn out concrete products for both underground and building construction. One of the company's principal products is the 10 × 14 × 10-inch concrete block that sells for 60 pfennigs, or about 15 cents in American currency.

Roof deck

Another busy concern producing concrete products in West Berlin is the plant of Arsen Schweizer. Starting out originally as a block manufacturer, Schweizer turned to prestressing two years ago with the production of double-tee shapes. His principal line now, however, is a patented concrete roof or deck slab. This system consists of small prestressed beams, placed about 2 feet on centers, and supporting between them lightweight concrete blocks resting on the lower flanges of the beams.

Beams are 9½ inches deep, with a 3½-inch-wide top flange and a 4¼-inch-wide bottom flange. The prestressing is done with deformed bars, rolled as wire, with one or two bars in the top flange and five through the bottom flange. The Krupp rectangular

steel, 0.2 square cm, has a tensile strength of 140,000 pounds per square inch.

Prestressing is done inside the plant on four beds, 75 meters (246 feet) long. The two middle beds hold four beams each, while the outer beds accommodate two beams each. Beams are cast with the bottom flange up so that a wooden sleeper may be attached to the concrete for ease later in placing a wire lath and plaster ceiling.

Wires are pretensioned from one end, and the steel forms are bulkheaded to the beam lengths required. Concrete is supplied from an Eirich mixer located near the live end of the beds, and is shoveled into the forms by hand. It is vibrated as placed. Forms are removed after 5 or 6 hours, and the exposed wires between lengths are cut after 48 hours. Brick aggregate from Berlin rubble is used in the mix, which has a high cement content. Concrete tests at 8,500 pounds per square inch. During the winter months, a temperature of around 60 degrees F is maintained in the factory, the management feeling that production is higher when the temperature is up. Summer temperatures do not often exceed 75 degrees F in the plant.

Special-shaped blocks for the patented roofing are cast outdoors at a central mixing and block plant, and stockpiled in the yard. The hollowed-out blocks are designed as two slabs, separated by a cavity, with another slab below, also separated by a cavity, on which the ceiling is carried. During erection, the space between block and beam is filled with concrete. In this design, the prestressed beams carry the loads.

East Berlin

The largest concrete works in the city, at Grünau, East Berlin, belongs to VEB Betonwerke. Here are manufactured reinforced-concrete members for the construction of apartment houses (floors, roofing members, door and window lintels, staircases, etc.) as well as sleepers and poles. The plant has an output of 100,000 tons a year, including 20,000 tons of prestressed-concrete products.

At the Meurin concrete plant in West Germany, a Liebherr crane loads truck with precast conduit for shipping.

Prestressing is done outdoors on a large scale. Building panels and slabs are cast sandwich fashion, one on top of the other, on beds 250 meters (820 feet) long. Wires for the pretensioning are pulled the length of the bed, jacked to the desired tension, secured in place, and snipped off with a wire cutter. Concrete is mixed at a central outdoor plant and discharged into buckets that are carried by gas buggies to the beds. Straddling the beds is a large gantry on rails, which lifts the buckets to an automatic concrete-laying machine that moves transversely across the beds while supported by the gantry. This machine places the concrete without the use of forms and also pushes steel tubes through the mix to form voids in the slabs or panels. Finished products are stored in an adjoining area, which is served by another large gantry on rails. A Panther truck-mounted crane works the yard, supplying materials to the production beds.

Reinforced-concrete sleepers are cast indoors by 2-man crews using a steel form equipped with an external vibrator. An "earth-dry" mix is used that permits a quick set. The form is no sooner filled than it is rolled over on its bowed supports and lifted off the freshly but firmly cast concrete sleeper.

West Germany

By a late count, West Germany has 70 plants turning out prestressed products. But the scene of greatest activity in concrete is in the vicinity of Andernach/Rhine, just north of Koblenz, where within a radius of 18 miles some 700 plants, large and small, are producing concrete block and allied products. The reason for the intensive activity in this area is a vast deposit of pumice, lava, and trass that was formed by erupting volcanoes in some remote primeval era.

Biggest producer of all is Trass-

(*Continued on next page*)

FAST CYCLE TIME *depends on swift, sure loading. Here a Cat D8 Tractor push-loads a DW15-No. 428 Tractor-Scraper combination. LOW-BOWL design assures a full load at every pass.*

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(*Continued from preceding page*)

Stockholm apartment house being constructed with Siporex blocks. Here a mortar truck is emptying into a hopper which in turn discharges into wheelbarrows. A hoist tower lifts the wheelbarrows to the desired floor level.

werke Meurin, which has been established at Andernach since 1862. Its present technical director, Ferdinand J. Meuser, a co-owner of the firm, once worked for Bethlehem Steel Co. in America, gaining experience in management and mass-production techniques. His company digs trass from a huge open pit and processes it into hydraulic cement. The firm also quarries volcanic lava slag and manufactures both portland and slag cement. It employs 330 workers.

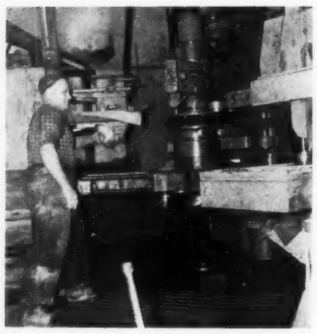
Concrete products include steam-cured lime-pozzolana bricks, lightweight hollow blocks and bricks of pumice concrete, reinforced roofing slabs of pumice concrete, and concrete pipe. The Meurin enterprise produces about 1,500 cubic yards of masonry brick in various sizes daily.

Sweden

In Sweden, one of the big names in concrete is Siporex, an international product with its headquarters and central laboratory at Soedertaelje, southwest of Stockholm. It is made by grinding sand and water into a slurry; adding cement, aluminum powder, and chemicals, and pouring the mixture into huge molds. The molds are put into an autoclave for steam curing under pressure. There the mix rises like a loaf of bread being baked. Before the big slab hardens it is easily cut into desired shapes of blocks, bricks, or panels. Siporex has many properties of concrete, yet it is light in weight and can be nailed, sawed, drilled, and cut like wood.

Prefabricated Siporex is used in the construction of many apartment houses in Sweden. Load-bearing blocks and slabs are the principal elements. The largest slabs are 19 feet 8 inches long, 4 feet 3 inches high, 10 inches thick, and weigh 2,648 pounds. Erection is done with a minimum of skilled labor.

In Upsala, north of Stockholm, AB S:t Eriks Lervarufabriker has developed an automatic process for making small concrete slabs used in paving walks, patios, driveways, etc. A Fejmert horizontal turbine-type mixer supplies concrete to the automatic slab paver.



In Upsala, Sweden, AB S:t Eriks Fabriker turns out small concrete slabs with this automatic paving machine.

The largest building contractor in Scandinavia, Skanska Cementgjuteriet of Tureberg, is also a producer of concrete. This 70-year-old firm casts blocks for homes and industrial buildings, wall slabs, floor beams, and pipes. Work is done inside in a roomy factory containing a central mixing plant, with the concrete fed by conveyor belt to the various casting areas. One of the more popular products turned out here is the large exterior wall panel with harsh exposed aggregate.

In Lovholmen, Stockholm, AB Strangbetong has a large prestressing factory on the waterfront, adjacent to a cement plant. Aggregates come in by barge and are moved inside on conveyors that ride a system of pre-

A Clark fork-lift gets bucket of concrete from Hilac mixer at the Glostrup, Denmark, plant of Larsen & Nielsen.

Folmer Jorgensen of the K. Hindhede plant at Roskilde poses by a stair flight, one of his company's popular concrete products. Jorgensen is also the president of the National Association of the Danish Concrete Products Industry.

stressed beams and columns. Three horizontal mixers supply concrete to the various beds that are 85 meters (279 feet) long. The company fabricates numerous beams, slabs, and bridge elements which are designed by its own engineers. All work at the plant is pretensioning; any post-tensioning required is handled at the job site. Another popular prestressed product is the railway sleeper. About 100 men are employed at AB Strangbetong.

Denmark

In Copenhagen, Denmark, one of the big block producers is the firm of Lemvigh-Muller & Munck A/S. The company's block is called Leca (light expanded clay aggregate) and weighs 36 pounds to the cubic foot. The popular size of block — 18 inches×7 inches×4½ inches — is light enough to be picked up easily with one hand. Yet it will take the place of five bricks, and is load-bearing. Blocks are produced in mass quantity on an automatic block machine.

Various sizes of reinforced-concrete wall panels are also produced. These panels or slabs are cast like a sandwich, with lightweight concrete in the middle to keep the weight down, and a layer of sand-cement mix on top and bottom for strength. The standard wall panels are approximately 6½ feet long × 1½ feet wide × 6 inches thick. All operations at the Leca plant are indoors.

Larsen & Nielsen, a prominent Danish contracting firm, started a precast-concrete plant in 1951 and has been expanding this "side line" ever since. L&N is still very active in construction both locally and abroad, and

(Continued on page 27)

A Towmotor fork-lift places wall panel on a delivery truck at the K. Hindhede plant in Denmark.

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MASSEY-FERGUSON INDUSTRIAL DIVISION

For more facts, use Request Card at page 18 and circle No. 216

(Continued from page 25)

competes with Belgian, Dutch, and French contractors for European work. It also cooperates in joint ventures and is presently engaged on one such job in India.

Its concrete-products plant is located at Glostrup, where precast elements for buildings are manufactured. Four production lines, each 250 feet long, are set up in one main 40,000-square-foot hall, where all the elements for a prefabricated apartment house—slabs, lintels, etc.—are turned out on an assembly-line basis.

Prestressed pretensioned beams and girders for heavier industrial buildings and bridges are cast outdoors. Any post-tensioning is done at the job site. Concrete is supplied from a central mixing plant containing three Hilac rotary mixers and a pair of horizontal mixers. They are set up at ground level and sheltered by a lean-to structure. Fork-lift trucks carry buckets of concrete from plant to forms. Current work includes the casting of 80-foot-long 20-ton prestressed beams for an industrial building at Kastrup. The wires are stressed, one at a time, with jacking equipment operated by compressed air.

K. Hindhede is a Copenhagen civil engineer who does contracting but whose biggest activity now is supplying concrete, both ready-mix and precast. The firm has five ready-mix and four precast plants in Denmark. Largest of the latter is the Betonvarefabriken Sjaelland A/S at Roskilde. A popular product turned out here is a concrete staircase that is shipped to points all over Scandinavia and also to England. Pipe, slabs, panels, and beams are also manufactured in large quantities.

Prestressing is done in a spacious hall on six beds, 60 meters (197 feet) long. Along one side of the factory, at the mid-point, is a central plant of twin horizontal-type mixers that discharge concrete into buckets. An overhead gantry picks up the buckets and moves them to the forms. Elements are stockpiled outdoors. Fork-lift trucks load members onto trucks for delivery.

(To be continued next month)

PRESTRESSED-CONCRETE COLUMNS and wall slabs for the new Sutter Junior High School in Sacramento, Calif., are manufactured at the site by Continental Construction Co. of that city. Calaveras Cement Co., San Francisco, Calif., is supplying the cement for the $1,577,000 project.

Hobart Trade School moves headquarters

The Hobart Trade School has moved into new quarters in Westbrook, Ohio. This is the first step in the evolution of the new Hobart Brothers Technical School, a nonprofit school devoted to teaching, research, and development in the welding field. Covering 80,000 square feet of floor space, the new building houses 120 welding stations for training students in the use of all types of arc and gas-welding equipment.

At present, only welding-operator training courses will be offered. The school is in session 52 weeks a year. Complete arc and gas-welding courses require 16 weeks, but it is possible to tailor a program of any length to meet specific individual requirements.

Surveying washington

by GEORGE RIVEIRE, JR.

Highway program beginning to show first results

The highway program, according to officials here, is fairly well over the rough "getting started" bumps and is now beginning to shift into second gear. Results are starting to show in more spots around the country as paperwork planning is translated into actual construction.

It will be a long time before the projected networks fall into an integrated whole, but the progress is considered generally heartening. No one denies there have been problems, often vexatious ones, and that the headaches will never completely go away. But that is inevitable in a program of this magnitude.

A few signs of the advances made are these: in the first two years of the program's life, construction contracts were completed on 1,771 miles of the Interstate System, and some 42,500 miles of construction finished on the ABC system. In addition, the stimulus of the special $400 million in anti-recession funds voted by Congress this year has already been felt. Some 358 miles of road construction were quickly started as a result.

All told, more federal funds were committed to the highway program during the first two years than roadmen anticipated. This is a good index that the program is on schedule.

Highway building costs remain on even keel

Highway building costs seem to be settling down. The index of average bid prices on construction during the second quarter of the year rose only 8 per cent over the preceding three months. The first quarter of 1958 was 2 per cent under the last quarter of 1957. There have been no violent upswings or downswings lately.

The slight boost in the second quarter index is due to a 3.9 per cent increase in excavation prices. Counterbalancing this jump, for the most part, was a 4.6 per cent decline in structural steel prices, which are down 13 per cent from a year ago. Little change took place in the index components of surfacing, reinforcing steel, and structural concrete.

Helping to keep road prices down in some areas, officials note, is keen bidding for contracts.

Big increase of road funds based on states' needs

Giving the highway program an additional shot in the arm is the new whopping apportionment of $3.4 billion in federal-aid funds for fiscal 1960, beginning next July. The allocations, based for the first time on a formula of states' needs, were announced long in advance so that states will have sufficient time to plan and permit the program to advance smoothly.

The new apportionment, the biggest yet made, includes $2.5 billion for the Interstate System, $300 million more than in fiscal 1959. The 1956 Highway Act had authorized a top outlay of $2.2 billion for 1960. But that provision was superseded by this year's new legislation that not only upped the amount, but made sure it would be fully apportioned by suspending the pay-as-you-go restriction.

Under the fiscal 1960 distribution, ABC highways will get $900 million, which is $25 million more than in 1959. Of this total, $405 million goes to the federal-aid primary system, $270 million to the secondary system of farm-to-market and feeder roads, and $225 million to urban sections of both systems.

California is the largest beneficiary, getting $302 million of the 1960 apportionment. Ohio and New York follow with $198 and $180 million, respectively.

The smallest sum, $12 million, goes to Delaware. This may seem small, but it is quite a package by the standards of only a few years ago. Another state, California will get more in 1960 for roads than the whole country re-

ceived in any single pre-World War II year.

An apportionment of $33 million for improving national forest roads during fiscal 1960 was also made. The heaviest share of these allocations—they do not have to be matched by the states—goes to California and Oregon. Idaho, Montana, Colorado, Washington, and Alaska also get big shares.

Effect of higher steel price on bridges held negligible

The increase in basic steel prices injects a note of uncertainty into the cost picture. However, observers here generally doubt that the rise will have too much effect on the price of structures, an especially important element on the Interstate System, where about one bridge per mile is the estimate. At most, it is expected that the price of highway structural steel will level off or increase slightly.

Actually, the highway construction industry has a good hedge against runaway steel prices in the use of prestressed concrete to build bridges. When steel prices get out of line, states can always turn to concrete, as some have done in the past. It is estimated that steel fabricators already have lost 5 per cent of their market in highway steel to prestressed concrete.

Except for spots here and there, these are not current problems. Highway steel is available in sufficient quantity, the Bureau of Public Roads states, and orders by contractors generally are being filled within 60 to 120 days. A year or so ago, it sometimes took 18 months for delivery from mill to fabricator to user. At that time, many builders were throwing up their hands in exasperation and turning to prestressed concrete as an alternative, wherever possible.

Time extended for states to buy right-of-ways

Congress pushed through to easy enactment a bill permitting states to buy right-of-ways for federal highways up to seven years in advance of the start in construction. The time limit was previously five years. The time for beginning work after purchase was extended so that the states would have more time to plan construction. It was felt that five years unduly hampered the highway departments.

The extension also means that the states can take more advantage of favorable costs, and buy before land becomes sky-high. A longer lead time will help here.

A state need not build along the entire right-of-way within seven years. An awarded construction contract for a "reasonable" portion of the actual work within that time would be enough to indicate the state's good faith and intention to carry through.

Congress also passed, without any stir, legislation to revive and codify the jumble of federal-aid highway laws into a single package. Now everyone will have a handy, up-to-date reference on what's what, instead of about 40 separate laws with conflicting and obsolete provisions.

Motor vehicle registrations continue to spiral upward

Motor vehicle registrations are still rising to new heights. The 1957 total comes to 67,135,546, a gain of 1,981,736 over the 1956 figure. In percentages, the gain is 3 per cent.

Of the total, 55,906,195 registrations were for passenger cars; 268,537 for buses; and 10,960,814 for trucks.

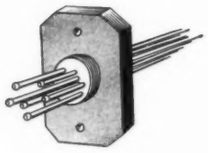
The range among the states ran from losses of 2.1 per cent in the District of Columbia and 0.6 per cent in New York State to gains of 8.5 per cent in Arizona and 10.7 per cent in Florida. These figures come from a survey conducted by the Bureau of Public Roads.

THE END

In the first 7 months of 1958, toll revenue on the New York State Thruway came to $16,112,324.55.

←For more facts, circle No. 218

Tides play role in erection of span's prestressed girders



(Additional photo on front cover)

With the tide at its height, a 75-ton American Revolver, opposite, starts lifting one of the 80-foot-long prestressed girders from barge to bridge. Girders are manufactured in Gerwick's prestressing yard a few miles up Petaluma Creek from the bridge. At center, the American Revolver begins to swing the big girder into place. At extreme right, girder nears final position. ►

Making use of the lowest possible tides to place concrete in the footings and the highest tides for erecting the highest girders, the contractor on the construction of the Petaluma Creek Bridge on California Highway 37 near Novato, Calif., took every possible advantage of nature's forces.

Probably the greatest advantage to the joint-venture contractors, Ben C. Gerwick, Inc., and J. H. Pomeroy & Co., Inc., San Francisco, was the fact that the bridge site is just a few miles down the tidal Petaluma Creek from Gerwick's prestressing plant at Petaluma. Most of the prestressed piles and girders for the structure were loaded onto barges at the casting plant and towed downstream to the bridge site where they were driven or set by floating equipment.

Replacing a narrow old timber trestle and bascule-lift bridge, the new high-level structure provides a four-lane divided roadway over the creek and adjacent lowland. The new structure clears the 160-foot-wide navigable channel of the creek by a minimum of 70 feet.

Solid footing on the west approach to the structure permits a 60-foot-high approach fill. On the east, however, the natural ground is an unstable mud flat which cannot support a fill of more than a few feet. The bridge structure was therefore extended in this direction until the 3 per cent grade of the roadway reached the natural ground level.

Girders span 80 feet

Designed by the Bridge Department of the California Division of Highways, the bridge uses a standard prestressed tee-girder section for most of its deck. The 2,200-foot-long structure is made up of 29 spans. Of these, 24 are of precast prestressed-concrete girders 4.5 feet deep and 80 feet long, four are of precast-concrete girders 25 feet long for the tower bents, and one is of 160-foot-long steel-plate girders over the ship channel.

Typical piers consist of two 4-foot-diameter columns resting on a 5 × 6-foot reinforced-concrete pile cap with 2 × 4-foot concrete struts at mid-height and a 5 × 5-foot concrete cap to provide bearing for the girders. Four of the piers at the west end rest on spread footings on the rock, while the others are supported on long piles.

Four tower bents improve the struc-

ture's resistance to earthquake stresses. These bents are actually two piers spaced 25 feet apart on a monolithic footing and tied together with heavy struts. Three or four of the girder spans to each side of the tower bents are tied together and to the tower bent to provide the longitudinal stability.

Building substructures

Excavating and constructing footings for the westerly four bents was a relatively routine matter of excavating into the bedrock and placing the concrete. Easterly from this point, the bedrock drops off very rapidly, and long piles were required. The contractor selected an optional pile consisting of a combination of a 26-inch-square prestressed-concrete pile and a 14-inch steel H-pile.

The 70-foot-long prestressed piles were cast at the Gerwick plant with a 6-foot length of the steel H-pile embedded in the tip. The 26-inch-square concrete piles have a 12-inch hollow center core formed by a Sonovoid and are reinforced with 34 prestressing strands carrying a working load of 394,000 pounds.

Where the piles were to be driven by land-based equipment, they were trucked from the plant to the bridge site and picked right off the trucks by the driving equipment. All of the concrete piles were driven by a skid rig with a 100-foot wooden tower using a differential steam hammer with a rating of 36,000 foot-pounds per blow.

Since none of the land-based equipment had enough reach to handle the extremely long piles in a single piece, the first sections of steel H-pile were driven first. Then the prestressed piles were placed in the leads and the protruding steel stubs were welded to the partly driven H-piles. Some of these piles were more than 200 feet long; the longest measured 205 feet.

Use floating equipment

In many respects the job was a natural for floating equipment. Yet there is a considerable length of the structure over the flats within the creek-bank levees. This area is simply mud and too soft for land-based rigs. At the start of the job, the contractor engaged a hydraulic dredge to come in and excavate a working channel for the floating equipment in this area.

(Continued on next page)

The plywood form for the 2-foot space between the girders, hung from double 2 × 4 needle beams with long she-bolts, is stripped easily and quickly. Two men on the deck remove needle beams and replace she-bolts with special thin she-bolts having long cables attached. The men tap these bolts to break the form loose, then control the lowering of the form by the cables running through 2 × 4 clamps on horses. A workman on a barge under the bridge guides the form onto a stack and unscrews the she-bolts so that they can be pulled back to the deck.

The channel is 160 feet wide, 600 feet long, and was excavated to 6 feet below mean low water. This required dredging as much as 12 feet of mud in some places.

Floating rigs operated in this channel to drive piles, erect forms, place concrete, and erect deck girders. The skid rig used on land was mounted on the deck of Gerwick's Derrick Barge No. 95 for the pile-driving operation. This big wooden barge also carries a diesel-electric-powered 50-ton Clyde Whirley crane with a 95-foot boom. The steel and concrete composite piles were assembled in a jig and welded together before the start of the driving; then the Clyde crane placed the pile in the leads. For the water-borne operation, the prestressed-concrete piles were barged directly from the prestressing plant to the bridge site.

Place footings at low tide

From five to eight piles, each with a bearing value of 200 tons, were driven for each pier. These were capped with a 5-foot-wide and 6-foot-high reinforced-concrete cap, the bottom of which is exposed at low tides. The elevation of the bottom of the footings is minus 1.0.

To eliminate the necessity for cofferdamming and dewatering, the contractor formed and poured these caps at low tide. Watching the predicted tide tables and all available forecast information, the contractor scheduled these operations during the time the entire footing was exposed.

The No. 95 Clyde Whirley handled forms and shoring for the workmen and bucketed the concrete into the forms using a Gar-Bro 2-yard bucket. In most instances, the concrete was bucketed directly from transit mixers parked on the old bridge; a small amount had to be barged out from a dock on the bank. Concrete for all the cast-in-place work was supplied by McPhail Co., Inc., San Rafael, Calif.

Columns were formed with circular steel forms supplied by Caral, Inc., Berkeley. The column form sections were assembled on the footings and were braced by scaffold towers erected around them. These towers also provided a place for the workmen to stand. Sectional metal tremies were used as the columns were poured in two lifts.

To provide a base for the construction of the heavy pier caps, the contractor attached a pair of long 36-

inch WF steel beams to either side of the columns at the tops. These beams rested on vertical 12×12 timbers founded on the pier footing and held to the side of the column with bolts anchored in Richmond coil inserts. These had been placed as the columns were built. No other shoring was necessary for the caps.

Prefabricated soffit forms for the caps were placed directly on the steel beams. The side forms were set up on these soffits and tied through with she-bolts. These forms were quickly placed with the aid of either floating or land-based cranes. In addition to the derrick barge, the contractor had a Bay City 25-ton motor crane, a Lorain 20-ton motor crane, and a Lorain 90 crawler mounted on a barge. All of these worked on the forming, concrete placement, or stripping.

Build girders in plant

The 264 prestressed girders, all 80 feet long, as well as the precast 25-foot girders, were built in the prestressing plant of Ben C. Gerwick, Inc., at Petaluma. Four new prestressing beds in the plant were used for the first time on these girders. These beds can handle sections up to 105 feet in length and are arranged side by side instead of in the more conventional in-line arrangement.

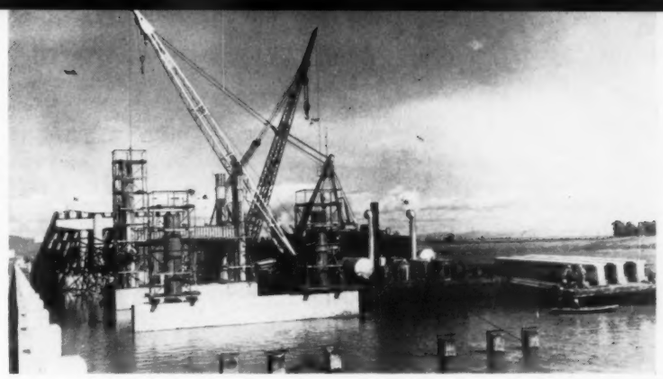
The forms built to Gerwick's specifications were supplied by Food Machinery & Chemical Corp., Riverside, Calif. Each of the girders carries 36 Roebling 7/16-inch, stress-relieved, seven-wire prestressing strands. Half of these go straight through in the bottom flange of the girder, while the remaining 18 are in the top of the web at the ends of the girders and are harped down at three intermediate points by Food Machinery & Chemical Corp. hold-downs.

The pretensioning load in the cables was applied by Rodgers 200-ton hydraulic jacks. This load was applied and the cables harped down before the forms were placed.

Concrete for the girders was a 7½ to 8-sack mix attaining a strength of

(*Continued on next page*)

Forms built to Gerwick's specifications by Food Machinery & Chemical Corp. are set for a girder at the prestressing yard. Roebling 7/16-inch cable is used, with 18 strands going through the bottom and 18 going through the top. Those through the top are deflected by hold-down devices developed at the Gerwick yard and now made by FM&C.



Derrick Barge No. 95, the Clyde Whirley, sets sectional steel column forms for one of the piers while Derrick Barge No. 125, the American Revolver, continues placing the prestressed girders. The scaffold around the column provides a platform for crews and serves to brace forms.

Girders for a low approach span are set by a Manitowoc 3900. This crawler handled the setting of girders on spans that could be reached by land.

(*Continued from preceding page*)

6,000 to 7,000 psi in twenty days under the plant's steam-curing system. Concrete, supplied by Petaluma Ready Mix Co., was delivered in transit mixers, transferred to Gar-Bro buckets, and placed by an overhead crane running on rails along the bed. When cured, the girders were either loaded on barges for shipment to the job or else stored in the yard to be trucked to the site as required.

Cranes erect girders

Where the girders could be set by marine equipment, the contractor used Gerwick's Derrick Barge No. 125, a 75-ton steam-powered American Revolver with 125 feet of boom. This rig picked up the girders from the barges using a long strongback and set them directly in place on the piers.

On the approach spans, where height was not a critical factor, an old derrick boom was used as a spreader for the two lines from the crane block to the ends of the girder. This relatively light spreader was also used by a Manitowoc 3900 crawler crane which set girders on spans that could be reached from land.

On the high spans near the channel, Derrick Barge No. 125 had to gain every possible inch of lift to get the girders up on the high piers. Two factors helped, the tide and a special strongback.

This strongback consisted of a pair of 36-inch WF beams about 80 feet long, with connecting members which hold them about five feet apart. This same assembly is used as a pair of rails when girders are placed with dollies. The crane holds the strongback by a pair of short cables attached near the center, thus making a relatively close coupling between the block and the strongback. The prestressed girders are hung from the ends of the strongback by a linkage which holds them as close as possible.

With the combination of a high tide and the short coupling, the American Revolver picked the girders off barges one by one and set them on the piers. However, the 18-ton strongback together with a 42-ton girder gave the 75-ton crane a near-capacity load.

Finishing deck

When the eleven girders of a span are in place, there are spaces between them about 30 inches wide in which the deck slab must be cast. The curb section on each end must also be formed and placed. The contractor worked out forming methods which permitted all of this work to be done without scaffolding being used under the deck.

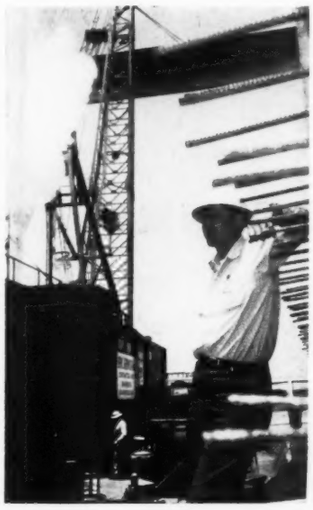
Deck forms were supported by double 2×4 hangers placed on top of the girders and spanning from one to the other, and were blocked up from the deck with 1-inch blocks at the ends. Sheets of three-foot-wide $\frac{5}{8}$-inch plywood were pulled up under the girder flanges and suspended from the 2×4 hanger beams with shebolts. These were threaded into studs attached to the plywood sheets. In this way, the form was completely suspended from the deck.

There was no room on the girder flanges to operate buggies, and concrete placing looked like a problem until the contractor improvised a rig for the job. An old Oliver farm-type tractor with widespread front wheels was located, and both front and rear wheels were adjusted so that they were wide enough apart to span from one girder to another over the hanger

beams. A ¾-yard Gar-Bro concrete bucket was suspended from an improvised A-frame on the rear of the tractor.

Transit mixers moved in to the closest available point and filled the bucket. The tractor was driven to the span being poured, and then it moved along, placing the concrete exactly as needed. Workmen simply vibrated the concrete into place and finished the surface level with the two adjacent girders. A 2-inch asphaltic-concrete surfacing was placed over the deck to complete the roadway.

The real advantage of the form system used on these fill-in slabs was in the stripping. Two workmen on the deck removed the top nuts from the



Superintendent John Ford keeps a watch on the job as the American Revolver raises a girder.

she-bolts and picked off the hanger beams. This left a series of the she-bolts embedded in the slab holding the plywood form up. These bolts were then unscrewed from the top. The two she-bolts on each sheet of plywood were replaced with two special thinner she-bolts to which long lengths of 3/16-inch aircraft cable were attached.

When these special bolts were in place and the others all removed, workmen tapped on the bolts with a hammer to break the form loose. As the form came away, the workmen snubbed up on the cables to control it, then lowered the plywood panel to the ground or to a barge waiting beneath. One workman below stacked the panels and unscrewed the bolts so that workmen on the deck could pull them back up through the holes for re-use on the next panel.

This complete operation actually took only about as long as it takes to read the description of it and required only three workmen.

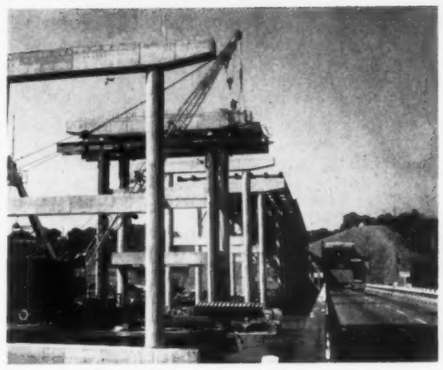
Steel girder spans

Spanning the navigable channel are 160-foot-long, 31-ton steel-plate girders which were furnished and erected under a subcontract by Moore Dry Dock Co., Inc., Oakland, Calif.

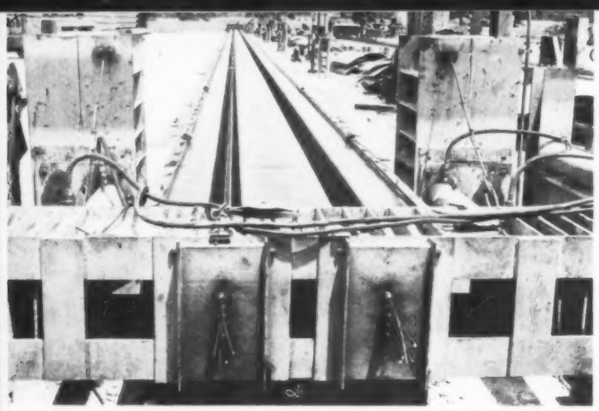
Work on the new bridge started in February, 1957. After the new structure is opened to highway traffic this month, the contractor will remove the old bridge, salvaging the bascule span for re-use on a secondary road.

Managing the project for the joint venture of Ben C. Gerwick, Inc., and J. H. Pomeroy & Co., Inc., was superintendent John Ford; assistant superintendent was Chuck Lochtefeld. Resident engineer for the California Division of Highways was Myron H. Jacobs. F. W. Panhorst is bridge engineer for the Division, and G. T. McCoy is state highway engineer.

THE END



The new high-level bridge over Petaluma Creek near Novato, Calif., rises next to the old bascule-lift span it will replace. Derrick Barge No. 95, owned by one of the joint-venture contractors, Ben C. Gerwick, Inc., San Francisco, is removing cap forming and shoring. J. H. Pomeroy & Co., Inc., also of San Francisco, is the partner on the job.



View of Campbell's 300-foot-long double-tee bed from the live end. The bed is a permanent concrete installation; only the 16-inch-deep stems are metal lined. Hot water pipes embedded in the concrete keep the bed at a constant temperature.

A busines uilt

by WILLIAM T. DARDEN, assistant ed

It isn't news any more when a contractor turns to production of concrete structural units. The increasing use of this highly adaptable material in America's building industry is causing somewhat of a revolution in design and erection procedures, and contractors have been quick to recognize the trend.

As the demand for precast and prestressed-concrete members grows daily, more and more contractors are producing these units as a profitable side line. For most, it represents a carefully planned venture and remains a side line to the contracting business.

Not so for Edward Campbell, a New Jersey contractor turned full-time producer. Almost by accident, Campbell found himself with a fast-growing concrete-product firm on his hands, and today he devotes himself exclusively to making block, special and standard precast units, and large prestressed members.

It all began with the concrete block. Back in 1943, Campbell had just completed a tour of civilian duty with the U. S. Army Corps of Engineers, and was preparing to resume his general contracting business. He needed concrete block, though, and it was pretty hard to come by. So he invested $2,226 in a block plant and started to produce his own.

From there on the business just seemed to expand naturally. Various types of special precast units were in demand, and Campbell found himself more and more involved in this sort of work. In 1946 he turned to more ambitious precast work, and two years ago he hopped aboard the prestressed bandwagon.

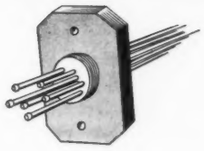
Today, the Campbell company does a $2 million-a-year business at Vineland, N. J., serving the southern part of the state. More than a quarter of this dollar volume is accounted for by the prestressed operation.

Campbell recalls that his investment in this business 15 years ago totaled $3,500. The inventory at that time was worth $225. His wife kept the books. One plant, a truck driver, and Campbell himself were responsible for the firm's output.

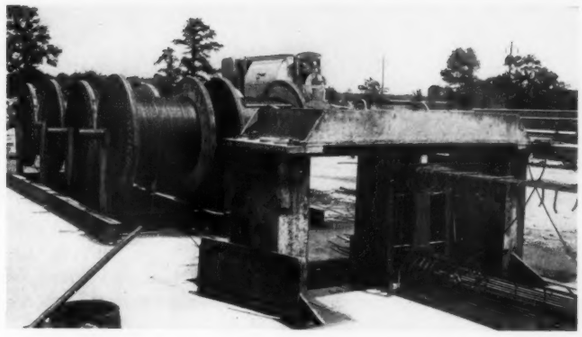
Four plants today

Today the Edward Campbell Co. employs more than 100 people. There are four plants on a total of 22 acres. In addition, Campbell operates a $250,000-a-year building-materials business that sells everything but

sines uilt on blocks



New Jersey contractor's humble block operation grows to $2 million precast, prestressed firm



Spools of Roebling ⅜-inch-diameter strand are mounted on skid frames at the dead end of the 300-foot-long universal bed. The dead end may be moved to any of four positions if shorter members are desired.

lumber and structural steel to building contractors over a wide area.

Equipment to produce and handle the concrete products is valued at well over $1 million, and includes two block machines, a concrete lintel machine, two concrete plants and batchers, two prestressing beds, a variety of forms for precasting units, and mobile equipment of every description for handling and transporting the products.

The company's largest operation takes place on a 19-acre site just outside the city of Vineland. Here are set up the prestressing, large precasting, and block plants. Much of the area is given over to stockpiling of the block and precast or prestressed units that are awaiting delivery.

A Blaw-Knox batch plant serves both the precast and prestress plants, the former being inside a building adjacent to the plant. Combined capacity of the regular and auxiliary cement bins is 750 barrels, and bulk cement is brought to the yard by railroad car, trucked to the plant site, and stored in the bins by means of a screw conveyor feeding an enclosed bucket elevator. The three-compartment bin has a capacity of 400 tons. Aggregate is purchased from local suppliers, and the bin is charged by a closed conveyor.

Of the two prestressing beds, one is a 300-foot-long double-tee bed 15 feet wide and having 16-inch stems. Two Rodgers 100-ton hydraulic jacks are used to pretension the Roebling ⅜-inch-diameter strands. Europa strand

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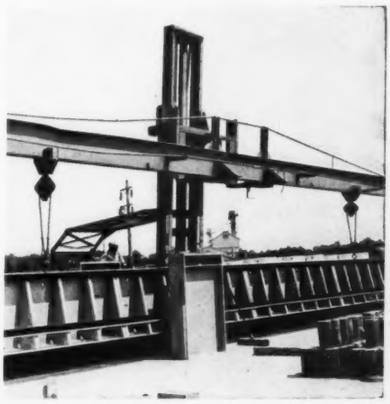


A Silent Hoist 12-ton lift truck with shop-fabricated boom handles Food Machinery forms in 40-foot lengths. Steel angles welded to the top and bottom permit handling of the forms in these lengths. The forms are being placed on the universal bed.

This Blaw-Knox batch plant provides concrete for precasting operations in the building at right. Cement is stored in the bin at left; aggregate is raised to the 400-ton 3-compartment bin at top by means of an enclosed elevator. The hopper at upper right dumps to the batcher inside the building.

(*Continued from preceding page*)

vises are used. Hot water pipes embedded in the concrete base of the bed and connected to a Continental 125-hp boiler keep the bed at a constant temperature.

A Scoopmobile is used to pull the pretensioning strands down to the live end of the bed. An initial load of 1,000 pounds is put on the strands by a Chatillon dynamometer. A wire gate placed over the strands at the live end protects workmen from the whip of a broken strand.

Alongside the double-tee bed is a 300-foot universal bed used to make a variety of shapes. Food Machinery pallets and side forms, the latter with removable inserts, are used on this bed. The side forms are braced at top and bottom with steel angles in 40-foot lengths, and are handled by a Silent Hoist 12-ton lift truck. Steam pipes are attached to the bottom braces.

Movable dead end

The universal bed has a movable dead end which can be brought forward for 200, 90, 60, or 40-foot pours. This results in a considerable saving in strand when the firm has an order for shorter members.

A Budgit ½-ton hoist, traveling on an overhead frame straddling the live ends of the two beds, moves the Rodgers jacks from one bed to the other.

After a pour, Horn curing compound is sprayed atop the concrete, and curved metal sheets are placed on top of the form to bridge the concrete and protect it from rain or other effect of the weather.

Stow vibrators and screeds are used to vibrate and strike off the freshly poured concrete, which is delivered by either a Jaeger 3½-yard mixer mounted on an International truck or a Rex mixer mounted on an Autocar truck.

A Forney compression tester in the adjacent laboratory is used to test sample cores of concrete about 15 hours after the pour. Then, if satisfactory strength has been achieved, the wires are detensioned and the forms stripped. The beams are lifted from the bed by the Silent Hoist truck and stockpiled nearby.

Inside the precast plant, dry mix from the Blaw-Knox plant is batched to a Fanning-Schuett traveling hopper which rides a rail to a Besser mixer. The mixer also rides on a rail between two bays, dumping to Gar-Bro 1-yard buckets handled by two Wright 3-ton overhead traveling cranes. These buckets travel the length of the bays, pouring directly to the precast forms.

The block plant, located in the same yard, has a Butler 400-ton aggregate bin, a Besser weight batcher, and two Besser 50-cubic-foot mixers. Two Besser Super Vibrapac machines

A Jaeger transit mixer mounted on an International truck chutes concrete to the double-tee bed while workmen use a Stow screed to finish the concrete. Cured double-tee beams are stockpiled in the background.

turn out 1,080 blocks an hour each. The blocks are handled on pallets and placed on racks which are then moved into curing rooms. Only seven men are required to operate the block plant. Normally, the plant operates on two shifts.

Campbell likes to keep a stockpile of about 400,000 blocks (8-inch equivalents) on hand, and these are piled up in the yard adjacent to the plant.

Special shapes

Campbell's fourth plant is set up on a 3-acre site which also contains the building that houses business and engineering offices. This plant is devoted to the manufacture of smaller, special precast units, such as items for homes, gardens, farms, etc. With the exception of the machine-manufacture of concrete lintels, the operation here is all hand work.

The lintel machine is a precaster which manufactures 11-foot lintels. A Stearns 50-cubic-foot blade mixer, a Fanning-Schuett 600-barrel cement bin, and a 150-ton six-compartment aggregate bin comprise the batch plant. An Ingersoll-Rand 165-cfm compressor supplies air for operation of the lintel machine gates, vibrating, stripping of the forms, and similar work.

Small units involving hand work and concrete lintels are manufactured in this plant. The batch plant at rear consists of a Fanning-Schuett cement bin and a 150-ton aggregate bin. The Towmotor lift truck (center) handles the units after forms are stripped.

Other equipment at the plant includes a Besser block splitter, a Tabor casting machine for small shapes, Stow vibrators, and a Hyster and two Towmotor fork-lift trucks. A Continental 50-hp steam boiler provides steam for curing.

Five welders and carpenters are kept busy constantly fabricating molds and forms for the entire Campbell operation, and the firm has a bill of anywhere between $1,200 and $2,000 a week for this form work. Strip bond breaker is used to strip forms and molds.

Among the four plants, the Campbell company uses about a carload of cement a day. Brands used include Nazareth, Lehigh, Penn-Dixie, Lone Star, and Medusa.

Campbell block and small precast units are supplied to jobs in a wide area of southern New Jersey. The large precast units and prestressed members are delivered in Fruehauf platform trailers or De Hart pole trailers to projects within a 150-mile radius of Vineland. Campbell does about 75 per cent of the erection work for these larger units, but hires the men and equipment for this operation as the need arises.

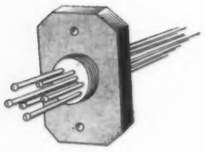
The engineering and sales department of the firm works closely with engineers in the specification of particular shapes for jobs requiring precast or prestressed members.

Personnel

The Edward Campbell Co. is a partnership involving Mr. Campbell; two of his brothers-in-law; Joe Darby, who is manager of the prestressing and precasting plants and handles purchasing and distribution; and Solve Falsetto. Campbell himself oversees design in addition to managing the entire firm. John Courter is general superintendent, manages the block plant, and has charge of buying equipment. George Courter is controller of the firm.

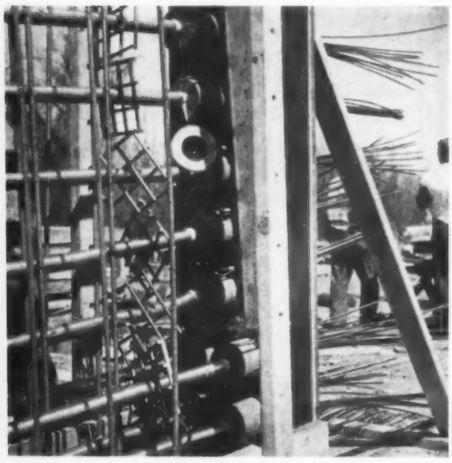
Solve Falsetto is personnel director and has charge of cost accounting, which Campbell points out is a most important phase of this operation.

THE END



(Additional photo on front cover)

Adjacent to the twin-bridge crossing of the Des Moines River, 101½-foot girders are post-tensioned. The Koehring 304 handles a form section.



A prestressed conical wedge, made by Freyssinet Co., Inc., holds the flexible tubing containing the wires.

Post-tensioned bridge girders turned out at rate of two a day

Setup for threading twelve wires through flexible tubing and unit for holding tension on wires make work go fast

by **BILL ALLEN**
field editor

Post-tensioned girders 101½ feet long rolled off the casting bed at the rate of two a day to speed work on a twin-bridge crossing of the Des Moines River, near Des Moines, Iowa.

To maintain this pace, the contractor made use of modern tensioning techniques, a fast-moving crew, and a fair share of ingenuity. A total of 84 girders was built on the approach fill on a 6-girder casting bed.

Jensen Construction Co. and United Contractors, both of Des Moines, started work on the $550,000 contract in January of this year and expect to complete the bridge this month. Brown & Blauvelt, New York, N. Y., is the designer of the unusual bridge, while Freyssinet Co., Inc., also of New York City, is responsible for the design of the girders.

Before the jack is put on the wires, the male plug is hammered into position in the middle of the wires. Twelve slots in the plug fit the 12 wires.

A common way of getting girders to the piers was with a tractor and crane. A Cat D6 pulls the dolly downhill while the American hangs onto the after end of the girder.

A hydraulic jack elongates 12 wires in the tendon 5 to 6 inches. Elongation is checked against the gage pressure on the Seco hydraulic pump unit.

A girder spanning from abutment to pier is lifted into place by a Manitowoc 2000 and the American. The American and a dolly were used to get the 101½-foot girder into position; then the Manitowoc lifted one end from the dolly.

In turning out the 84 post-tensioned girders for the Des Moines River crossing, Jensen Construction Co. and United Contractors used jacking and grouting equipment furnished by the Prestressed Concrete Division of Intercontinental Equipment, Inc., New York, N. Y. Each jack was activated by a Seco hydraulic pump, made by Simplex Engineering Co. and driven by a Wisconsin 1-cylinder gasoline engine. Post-tensioning wires were furnished by American Steel & Wire Division of U. S. Steel Corp. Steam for curing was supplied by a Cleaver-Brooks 150-hp boiler. Freyssinet Co., Inc., which designed the girders, also makes the special precast conical wedge used to hold tension on the wires. A Koehring 304 crane bucketed concrete to the girder forms.

An Engineered Equipment batch plant was used to turn out concrete for the job, and a Wagnermobile front-end loader was used to feed the 3-compartment bin of the plant.

An American Model 599 40-ton crane and a Cat D6 tractor were used to carry girders down the approach fill so that they could be hoisted into position. The American crane and a Manitowoc Model 2000 lifted the girders into place. Cavity sections between girders were poured by the Koehring 304, handling a Gar-Bro ¾-yard bucket; the concrete was delivered to the crane by a Transcrete 3-yard mixer on a Ford F700 truck.

Moving girders into position for the lift was sometimes a tricky job. An American 599 backs down the steep incline from the casting bed while the rear of the girder rests on a dolly. The dragline of a Manitowoc 2000 keeps the dolly from rolling too fast.

Build bridge over dry land

The 7-span 710-foot twin bridge will link the 4.3 miles of construction, now under way on Interstate 35, which will bypass Des Moines north of the city. Although the bridge was built over dry land, its two 30-foot roadways will soon carry traffic over the relocated channel of the Des Moines River. As part of the highway construction, the channel is being changed to cut out a bend in the river.

Since the water was not flowing under the bridge during construction, work on the reinforced-concrete piers was simplified. A high water table, however, made it necessary to use a wellpoint system in excavating for the block footings. With the water out of the excavation, it was no problem to drive the 30 H-beam piles that support each pier. The piles were driven as much as 45 feet down to shale.

Concrete girders

By making all the spans the same length, the designer greatly simplified the construction of the girders. All 84 of the I-shaped girders are identical. They measure 101½ feet

(*Continued on next page*)

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Crews set reinforcing steel at one end of the bridge while form work goes on in the center section. In the background are the batch plant and casting beds.

long and 5 feet deep, and each weighs 40 tons. Each girder contains nine 12-wire tendons stressed to a final tension of 124,900 psi. The tendons, which are encased in flexible tubing, sag to a level of from 3 to 15 inches above the bottom of the girder at the mid-point.

To provide a casting bed large enough to hold six girders, the contractor poured a 6-inch slab (10 inches thick under the ends of the girders) on the east approach fill near the bridge. Each girder was formed on a plywood bottom which rested on transverse 4×4's. The transverse members were nailed to two longitudinal 2×4's that were set in the concrete. Steam for curing was piped in from a 150-hp boiler.

Contributing to the speed of the operation was an ingenious setup for threading the twelve 0.276-inch wires through the flexible tubing. The coils of wire were first put on a twelve-reel rack. The reels, obtained at bargain prices, were built out of old steel-spoked equipment wheels.

The reels fed onto a wooden trough that held the 203-foot lengths of flexible tubing. The first step in threading the bundle of 12 wires through the tubing was to shove a single wire through the length of the tubing. A special holding device at the end of this wire grabbed the bunch of twelve and pulled them through the flexible tubing. A small winch, at the opposite end from the reels, did the pulling. The tubing was cut in half to run the length of two girders.

Special steel bulkhead plates held

the ends of the nine tendons in place. The plates also held the female member of the precast-concrete conical wedge. This member, which was cast into the end of the girder, held the tension on the wires after they had been pulled. The slotted male member of this assembly, also of precast concrete, was driven in from the outside after tensioning.

At intermediate points along the sagging tendon, temporary vertical rods held the flexible tubing in its correct position. After the reinforcing steel had been set, the tendons were wired to the reinforcing bars.

To maintain the production schedule of two girders per day, the contractor used four sets of forms. The wooden forms, built up in sections, were faced with marine plywood.

An efficient batch plant, set up on the site, speeded the pouring of the girders. An unusual but effective piece of equipment—a front-end loader—made the 30-foot-high lift to charge the 3-compartment bin of the aggregate batcher. At the aggregate batcher, both water and Pozzolith were metered out to the transit-mix trucks. The plant also contained a 2-spout cement batcher with a 500-barrel overhead silo. All controls were manual.

The transit-mix trucks made the short trip to the casting bed, and the concrete was bucketed to the girder forms by a crane. The 5,000-pound concrete was vibrated as it was placed.

Steam curing started four hours

(*Continued on next page*)

The Koehring 304 on the job uses a Gar-Bro ¾-yard bucket to pour cavity sections at the ends of the girders. The Transcrete 3-yard mixer on the Ford F700 truck delivers concrete to the crane.

For more facts, use Request Card at page 18 and circle No. 229

A Wagnermobile front-end loader with ¾-yard bucket makes a 30-foot lift to charge the 3-compartment aggregate bin of the Engineered Equipment batch plant.

after a pour. The girders, which were covered with a double layer of plastic and canvas, were kept at a temperature of not more than 140 degrees for about 36 hours to gain a 4,500-pound break. Live steam jetted up through the forms from pipes lying alongside the girders.

Tensioning

After the 4,500-pound break, the tendons were stretched from about 5 to 6 inches in a predetermined order. The hydraulic jack tensioned four of the tendons, individually, from one end of the girder, and the remaining five from the opposite end. The jack pushed against a steel ring that was threaded over the end wires. Wedges on the side of the jack gripped the individual wires.

When the wires had been stretched, a smaller ram in the jack shoved home the male member of the cone wedge to hold the tension on the wires. Final tension was 124,900 psi. After the wires were pulled, a non-shrinking grout was pumped at 100 pounds pressure through the ⅜-inch-diameter hole in the cone wedge.

Erection

Moving the 40-ton girders from the casting yard to the tops of the piers was no small job. The girders had to be eased down the steep slope of the approach fill to the area between the twin bridges.

When a girder was ready to be handled, the forward end was set on an eight-wheel dolly pulled by a tractor. The rear end was held by a 40-ton crane. After the crane and tractor maneuvered the girder into position, another crane was moved in to help the first make the lift to the tops of the piers.

Personnel

For the joint venture, J. C. "Sag" Wolcott is the superintendent and Clarence "Huck" Meis the foreman in charge of the girder crew. John Pearson is resident engineer for the Iowa State Highway Commission. Inspectors on the job are Bob Sandy and Bill Ellingson. THE END

Bituminous paver depicted in new film

"New Concept for Paving", released by Iowa Mfg. Co., Cedar Rapids, Iowa, presents a new approach to the problem of laying acceptable bituminous mat at high speeds. The 24-minute sound and color film points up the importance of improvements in bituminous-paver design.

Close-up views of actual paver construction in the factory show in detail many of the machine's design features, and how these features are applied in the field.

The movie is designed to be shown to contractors; highway engineers and departments; federal, state, and county highway associations; civic groups; chambers of commerce; schools; or any other groups interested in promoting good roads. The company will lend copies of the film to these groups.

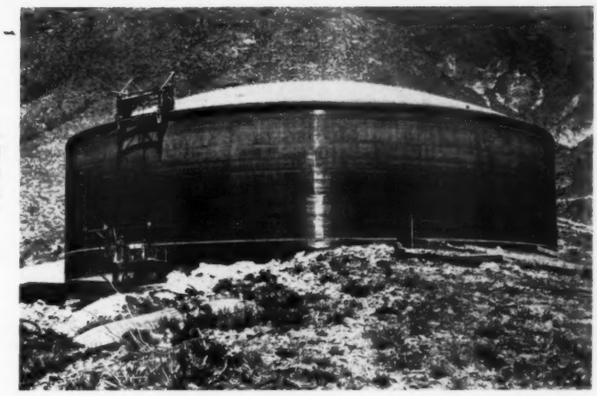
Clark plant to make all-weather cabs

Clark Equipment Co.'s plant at Miller St., Benton Harbor, Mich., will fabricate all-weather cabs for earth-moving and material-handling equipment. Main frame welding and final assembly of Ross straddle carriers were done at this plant before the Ross Division moved to Battle Creek, Mich.

The cabs will be mounted on several Industrial Truck Division products—fork-lift trucks, towing tractors, and straddle carriers; and on Construction Machinery Division tractor shovels, scrapers, dozers, loggers, and excavator cranes. The Miller Street plant is also making combination overhead-guard cabs for some units.

Armco Drainage promotes

John R. Hursh has been named chief engineer of the products engineering staff of Armco Drainage & Metal Products, Inc., subsidiary of Armco Steel Corp., Middletown, Ohio. Hursh succeeds George E. Shafer, who has retired as vice president in charge of engineering. Paul Buker has been appointed supervising product engineer in charge of all building design.



FINAL PRESTRESSING is under way on the second of two 2-million-gallon water tanks for the Public Service Board, City and County of El Paso, Texas. The 104-foot-diameter 31½-foot-high tanks were designed and prestressed by The Preload Co., Inc., New York City. Robert E. McKee, Inc., El Paso, is general contractor on the project, which will be completed this month.

South American highway mapped 3,000 miles away

The Syosset, N. Y., engineering firm of Lockwood, Kessler & Bartlett is mapping a 250-mile highway for a country 3,000 miles away. The highway will cross rugged and remote mountain terrain still in the pack-mule era as far as direct overland travel is concerned. Located in Colombia, South America, the highway will run southeast from the major industrial center of Medellin to La Dorada, a port city on the Magdalena River, and there it will connect with another projected road to Bogota, the capital.

The engineering firm never considered plotting the road by conventional methods. A photogrammetry crew spent several weeks taking pictures of the area, and since the equipment for the mapping work could not be duplicated in South America, the photographs were brought to the home office.

Here, aerial photography experts matched up dozens of pictures and mounted them on a long board. These photos gave a complete scale view of every hill, valley, and stream in the area. Then, with the help of stereoplotters, technicians traced "along the ground" of the photographs and constructed topographical maps.

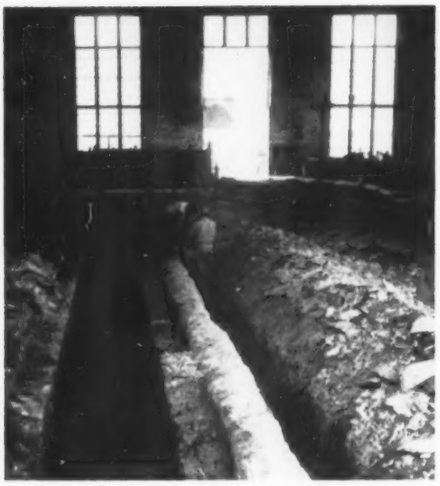
Using the photos and maps, the engineers are laying out the highway. They can tell, for example, whether or not to deflect the road a few miles to take advantage of a natural grade or mountain pass, or where it will be most feasible to bridge a stream.

But even more important, the firm can use one surveying expedition to chart alternate routes. Lockwood, Kessler & Bartlett engineers have already sketched out several possible routes swinging to the north and to the south of Medellin.

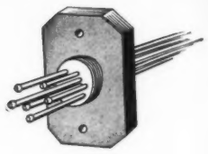
C. S. Johnson changes its sales personnel

The C. S. Johnson Co., subsidiary of Koehring Co., Champaign, Ill., has placed Harold E. Buckler in charge of all sales for the company. Buckler, who is now located in the home office, was sales manager of Johnson's Western Division at Stockton, Calif. He is succeeded in his former post by Jack D. Shoemaker.

A. K. Downs will devote considerable time to an expanded sales program dealing primarily with large automatic concrete plants and special plant installations.



Workmen excavate trenches for the longitudinal stiffeners of one of the new casting beds at the Trenton, N. J., prestressing plant of Brann & Stuart Co. The additional beds will make it possible for the firm to handle components with draped pretensioning strands.



Contractor's prestressing work grows into a company division

by ANTHONY N. MAVROUDIS, field editor

After examining the potential market and many prestressing yards for a few years, Brann & Stuart Co., Trenton, N. J., went into prestressing in a big, expensive, and confident way.

This was the gist of a feature on this firm's plunge into prestressing last year. (See "Contractor Turns Producer, Now Makes Prestressed Components", C&E, Sept., 1957, pg. 50.) Since then, Brann & Stuart's prestressing operations have grown beyond expectations, and the firm is now planning a further expansion—again in a big, expensive, and confident way.

Form new division

The firm is sponsoring the expansion plans of Atlantic Prestressed Concrete Co., a new division of the company.

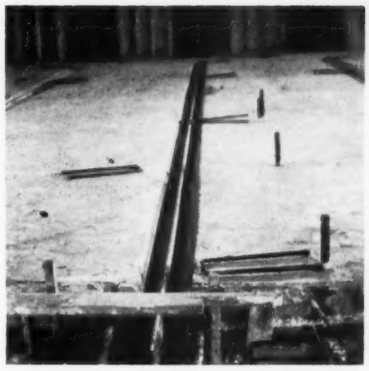
The Warner Co., which has been supplying the ready-mix concrete for Brann & Stuart's prestressing plant in Trenton, has an interest in the new company. This setup has advantages that work both ways: the prestressing plant to be built will be assured of a nearby source of concrete; and Warner will be assured of a constant market throughout the year. This will smooth out the wide seasonal fluctuation which Warner experiences in producing only for construction projects. A prestressed-concrete plant can almost guarantee the use of a fixed quantity of concrete daily, regardless of weather and other factors that have an effect on construction jobs.

Plants start production

This month, Atlantic Prestressed is ready to start full-scale production at two locations—Trenton, N. J., and New Castle, Del. New beds have been set up at the existing plant site in Trenton; the New Castle plant, on a new location, has similar casting beds.

The new company retained consulting engineer Ross H. Bryan, Nashville, Tenn., to design the new beds, which make it possible for the firm to handle draped pretensioning strands. There are three rows per bed, and both beds have an effective length of 250 feet.

Over-all dimensions of the new beds are 282 feet in length and 24 feet in width. The casting bed slab, between the end abutments, is strengthened by three reinforced-concrete longitu-



Deflector rails to hold down depressed strands during stressing operations are embedded in a slab. Each rail runs above longitudinal stiffeners which resist the upward forces set up during stressing.

Beds for stressing draped strands are built at old and new yards; production starts this month as plans are made for further expansion

dinal stiffeners poured with the 8-inch-thick slab. These stiffeners, spaced 7½ feet on centers, are 1½ feet thick and extend 2 feet 4 inches below the slab.

The main purpose of the slab stiffeners is to hold down the deflector rails, which are used to depress pretensioning strands, and to provide the rigidity necessary to resist the tremendous upward forces encountered when draped strands are pretensioned. No. 5 stirrup-shaped anchors, spaced on 12-inch centers and passed through the deflector rails, tie the deflector rails into the slab-stiffening girders. There are three rails per bed—one for each row.

The casting bed slab is supported at each end by reinforced-concrete anchorages which are 6 feet deep, 24 feet wide, and 30 feet long. Each anchorage has four monolithically poured reinforced-concrete anchor columns, 6 feet high and 6 feet long, set about 10 feet in from the end of the casting bed. The two exterior columns are 2 feet wide and the interior columns 2½ feet wide. One set of columns supports the live or jacking end of the casting bed while the dead or fixed end is supported by columns at the opposite side of the bed.

Atlantic Prestressed decided to build this latest type of casting bed at New Castle and Trenton because of the many advantages of using draped pretensioning strands. The beds are versatile, because each can be used as a conventional universal casting bed with only straight strands.

The biggest advantage of draped-strand girders is that they have an increased load-carrying capacity without an increase in the girder section. Another advantage: draped-strand girders or beams can be used in rigid frame construction, something not possible with conventional stressed members.

Basically, the casting bed at New Castle is the same in design as the one at Trenton. But the New Castle plant will have two 25-ton-capacity Travelifts straddling the 24-foot slab to handle placement of forms and the lifting and stockpiling of completed prestressed-concrete components. Equipped with rubber tires, and having a 26-foot horizontal clearance, the rigs will ride two 3-foot-wide concrete aprons along the edges of the slab. They will be able

(*Continued on next page, Col. 4*)

STRUCTURAL TILE for a new aluminum plant in Hannibal, Ohio, is picked up by an American Econmobile Model 600, one of five on the project. F. H. McGraw & Co., New York City, is the contractor on the building for the Olin Mathieson Chemical Corp.

Stone & Webster forms subsidiary in Holland

A Netherlands subsidiary, Stone & Webster Engineering N. V., has been established by Stone & Webster Engineering Corp., Boston, Mass. The new subsidiary, headquartered in The Hague, will provide a wide range of engineering, procurement, and construction services to clients in western Europe.

The firm has altered the names of its affiliates in Britain, France, and Australia. In Britain, E. B. Badger & Sons, Ltd., which merged with Stone & Webster in 1951, becomes Stone & Webster Engineering Ltd. The French subsidiary, formerly known as Etablissements Badger, S. A., is now Stone & Webster Engineering S. A. Both of these subsidiaries are active in engineering and construction for the petroleum and petrochemical industries throughout western Europe.

The Australian subsidiary, E. B. Badger & Sons Pty. Ltd., is now known as Stone & Webster Pty., Ltd.

Bendix names chief for development group

Dr. Harry D. Huskey is coordinating the activities of the newly formed Advanced Programming Development Group for the Bendix Computer Division of Bendix Aviation Corp. in Berkeley, Calif. The group is currently engaged in developing compilers for the G-15D general-purpose computer system.

Dr. Huskey, an associate professor in electrical engineering and mathematics at the University of California at Berkeley, is one of the foremost pioneers in the field of electronic computers and has served as consultant to Bendix since 1953.

(Continued from preceding page)

to run onto and off the beds as operations demand. The Travelift aprons carry steam, water, and electric lines.

The New Castle bed is 282 feet long and has an effective working length of 250 feet for each of its three casting rows. The abutments required about 220 cubic yards of concrete and are heavily reinforced with 1½ and 2-inch-diameter reinforcing bars. These are tied into the steel of the longitudinal stiffeners in order to tie the abutments and casting slab together structurally.

Confidence in future

The growth of Atlantic Prestressed stops here, but only for the present. Plans are already under way for expansion throughout many of the surrounding states. The use of prestressed-concrete construction is spreading, and the firm — confident in the growth of prestressed-concrete construction—feels that as more and more engineers become familiar with prestressed design and its capabilities, the market will expand. Next year's progress report on this company still remains to be written, but even now it looks bright. THE END

Soil stabilization, flexible pavement studies

The Highway Research Board, 2101 Constitution Ave., Washington 25, D. C., has issued two new bulletins—"Soil Stabilization Studies, 1957", Bulletin 183, and "Flexible Pavement Studies and Georgia Design Practice", Bulletin 177.

Bulletin 183, containing five papers on soil stabilization by means of additives, describes the results obtained on Ohio's secondary roads, the methods and results of a study on the effect of density on the strength of lime-fly ash stabilized soil, and the strength characteristics of soil-aggregate mixtures. The last two papers deal with the results of the use of dust from expanded shale as an admixture in lime stabilization, and the improvement of strength of soil-cement with additives. This bulletin is priced at $1.

A load-deflection study of selected high-type flexible pavement in Maryland is reported in Bulletin 177. This bulletin also contains data on flexible pavement design as currently practiced in Georgia, and an evaluation of pavement systems of the WASHO road test by layered system methods. The price of this bulletin is $1.20.

Both bulletins may be purchased from HRB headquarters.

Pavements and traffic topic of HRB bulletins

Three bulletins have been issued by the Highway Research Board: "Development of New Non-Skid Road Surface Treatment", Bulletin 184; "Tests of Energy-Absorbing Traffic Barriers", Bulletin 185; and "Vehicle Performance as Affected by Pavement Edge Lines and Traffic Signals", Bulletin 178.

Bulletin 184 describes development and laboratory and field testing of a new skid-resistant roadway surface treatment based on thermosetting epoxy resins, and the service testing of the same surface treatment which was applied to the concrete apron and toll booth area at the Milford Toll Station on Connecticut's Wilbur Cross Parkway. Price of the bulletin is 50 cents.

Crash barrier tests on multiflora rose hedges are described in Bulletin 185. This bulletin also describes the development and testing of an energy-absorbing barrier for highways. The barrier consists of a series of corrugated concrete slabs extending about 2 feet above the road surface and arranged in a row in the center of the median strip. This bulletin costs 60 cents.

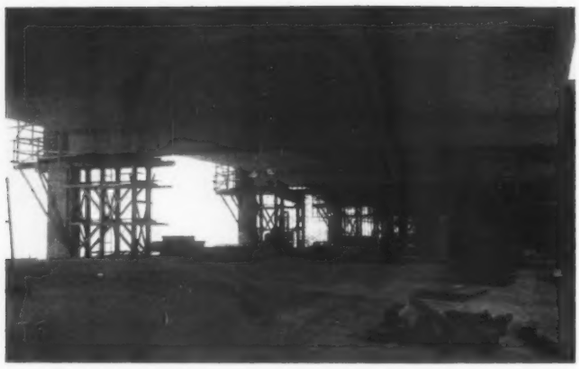
Platoon movement of traffic from an isolated signalized intersection, and pavement edge lines on 24-foot surfaces in Louisiana are reported in Bulletin 178, which is priced at 60 cents.

All three bulletins may be purchased from the HRB, 2101 Constitution Ave., Washington 25, D. C.

Australian firm to make Wisconsin Motor engines

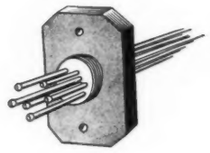
An agreement, which will increase production of Wisconsin air-cooled engines in Australia, has been signed between Wisconsin Motor Corp., Milwaukee, and Ronaldson Bros. & Tippett, Ltd., Ballarat, Victoria. Models produced by the Australian firm will incorporate all of the heavy-duty features of design, making them identical to those Wisconsin engines produced by the Milwaukee firm.

For the past five years, the Australian firm has been producing two multi-cylinder models of the Wisconsin engine line. It recently placed a single-cylinder model of the line in production.



The long span of the prestressed pier caps supporting the box girders of the second deck of the Embarcadero Freeway structure in San Francisco are visible from the lower deck. These long caps span up to 88 feet.

Integral pier caps are post-tensioned



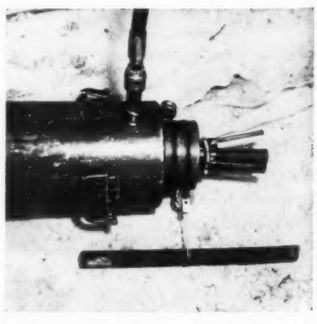
The prestressing of thirteen of the longest pier caps on the Embarcadero Freeway structure in San Francisco made it possible to span up to 88 feet clear over the six-lane lower-deck roadway. The pier caps were cast in place integral with the columns and the box-girder deck, and were then post-tensioned.

Using the Stressrods system, Rods, Inc., Berkeley, Calif., subcontracted the furnishing and stressing of the steel from general contractor Charles L. Harney, Inc., San Francisco.

Stressrods tendons of 1⅛-inch diameter were used on the job, with an ultimate strength of 165,000 to 177,000 psi and a yield strength of 130,000 to 140,000 psi. In the final operation the rods were available in maximum lengths of 77 feet; any additional length was obtained by using the Howlett Stressgrip coupling device to couple them together into desired lengths.

The Howlett Stressgrip coupling and Howlett wedge nut, which provides the end anchorage, consist of two threaded sleeves. Tapered threads between the two sleeves provide a wedge effect while specially designed teeth on the inner surface of the inner sleeve grip the rods firmly, yet cause no reduction in the cross-sectional area of the rods.

The big pier caps, which are formed and poured integral with the columns and with the box-girder deck, are 4 feet wide and 8.5 to 9.5 feet deep. This leaves them projecting 4 or 5 feet below the bottom of the 4.5-foot-deep deck.



A mock-up of the measuring device. The pointer on the head of the jack is attached to a small horseshoe magnet. A mark is made on an adjacent rod before stressing starts. The distance between this mark and the pointer shows the amount of elongation.

Prestressing of big pier caps on freeway structure provides long clear spans for six-lane lower roadway

After the rods are stressed, the space inside the sheaths is grouted. The grouting nozzle fits into the hole in the locking nut and is held in place with a C-clamp arrangement. The hose from the grout pump is attached by the quick coupling in the workman's right hand.

Placing the steel

From 37 to 56 of the Stressrods, encased in U-100 Universal Metal Hose sheaths, were placed in the caps together with conventional stirrups and temperature reinforcing. The rods were placed in a parabolic pattern, the steel concentrated near the bottom of the section at the center of the span and distributed over the cross section at the ends.

Forming and concrete placement for the prestressed caps were the same as for the rest of the structure, but a richer mix—7½ sacks per cubic yard—was used. Specifications provide for curing until a strength of 3,000 psi is attained for the conventional members of the structure while the prestressed members must attain 4,500 pounds before post-tensioning. This created no problems, since the richer concrete was usually ready for stressing in 7 days while the rest of the structure generally had to cure 10 days before stripping could begin. This left plenty of time for the post-tensioning operation and did not interfere with the general contractor's stripping schedule.

Post-tensioning

The post-tensioning crew first cut the protruding ends of the metal sheaths flush with the concrete of the ends of the caps. They next placed 1⅜-inch steel bearing plates over the ends of the rods and against the concrete. The Howlett wedge nuts were slipped over the ends of the rods and tightened by hand.

A jack stand and wedge setting pin were placed, and the 100-ton Simplex jacks slipped over both ends of one of the rods. These are double-acting hydraulic jacks with a 10-inch stroke. The hydraulic pressure for both jacks was supplied by a Lincoln Ram-Pac unit made by Dozier Mfg. Co., Oakland, Calif. The unit was powered by air from a compressor. Jacking plates and wedge grips locked the jacks to the rod.

The jacks were actuated up to 500 pounds pressure, putting a stress of about 10,000 psi in the rods. This took up any slack and readied the rod for the full stressing operation.

To indicate the amount of the elongation, Rods, Inc., used a very simple but clever device. A fine steel

(Continued on next page)

The jack stand and wedge setting pin are set. The 1⅜-inch-thick bearing plates are placed over the 1⅛-inch-diameter Stressrods, which are in U-100 Universal Metal Hose sheaths. Howlett wedge nuts, placed over the rods, have been tightened by hand.

A Simplex 100-ton double-acting jack with a 10-inch stroke is then set. Similar jacks are placed at each end of a pier cap.

The jacking plate and wedge grip are set to give the jack a firm grip on the rod, and the setup is ready for stressing.

(Continued from preceding page)

pointer about five inches long was attached to a small horseshoe magnet, and the magnet was placed on the side of the jacking plate so that the pointer lay just over one of the adjacent rods. A scratch on the rod indicated the starting point of the elongation; another scratch 2½ inches away indicated the end of the elongation.

When the initial 500 pounds of pressure had been applied and the indicator set in place, the jacking was started again. One jack was operated at a time to stretch the rods to 120,000 psi—an operation which required a gage pressure of 5,600 pounds on the jack. When the desired elongation had been reached, the valve was closed to hold the jack while the other end was stressed. When both ends had been pulled to the desired stress, the locking pin of the wedge nut was driven home to lock in the stress. The jack was then removed. Some 12 to 15 rods were stressed per hour.

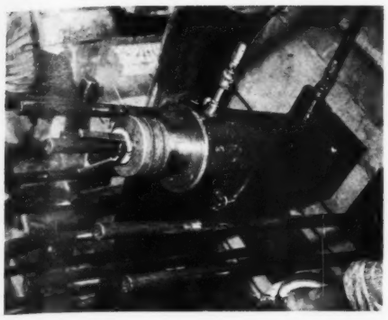
The air-operated Dozier Lincoln Ram-Pac unit was made especially for Rods, Inc., for operating these jacks. The Ram-Pac unit is mounted on top of the oil reservoir which is fitted with wheels so that it can be moved easily. Separate lines run from the unit to each jack so that the jacks can be operated separately or together. Valves reverse the flow of the fluid, permitting the double-acting jacks to be returned to the starting position after each stressing.

Coordination of the jacking operation at the two ends was facilitated by the use of special telephones. These had wires strung across the deck to permit workmen at both ends to talk to each other, regardless of the amount of noise in the area.

On these caps, a total resultant working force of 4,820 kips was applied to the rods after allowance for all losses.

Grouting

When the stressing of all the rods in the cap was completed, the spaces between the rods and the sheaths were filled with grout. Two grout mixers were set up in tandem so that the grout could flow from the first to



The jack is held in the extended position while stress is applied from the opposite end. The locking wedge is then driven home.

The rod is being stressed. A Dozier Lincoln Ram-Pac unit on the oil reservoir supplies hydraulic pressure. A special telephone keeps the crew in touch with men on the opposite end of the pier cap.

the second by gravity. The mix was picked up from the second tank by a Dozier Lincoln Ram-Pac pump. The discharge line from the pump branched into two lines which were valved so that they could be operated independently.

The grouting nipples attached to the wedge nuts on the ends of the rods with a C-clamp arrangement that was quickly placed and removed. The nipples were fitted with quick couplers of the type used on air hoses. A number of these nipples and the two discharge lines from the pump were used, and the grouting job went very quickly. On this job the sleeves were grouted at a rate of about 25 per hour.

The grouting mix consisted of 4½ gallons of water to a sack of Type II cement and two ounces of Plastiment.

After grouting and testing were completed, the excess lengths of rod were burned off, and a concrete cap was cast over the end of the pier.

Personnel

The job of placing and stressing the 80 tons of high-tensile rod in thirteen pier caps on this job was supervised by Sidney Kemp for Rods, Inc. The resident engineer for the California Division of Highways on the project is D. R. Higgins.

THE END

Basalt starts service on prestressed units

A new consulting service on the manufacture of plant cast, prestressed-concrete products has been established by Basalt Rock Co., Napa, Calif.

It is designed to aid concrete manufacturers entering this field in avoiding costly mistakes which often accompany such expansions. Basalt Consultants will cover every phase of the business including such basic problems as plant design to satisfy marketing designs of the particular area, and selection of products and shapes to be manufactured.

In addition, the service will supply technical assistance, train key engineering and plant personnel, provide engineering data, test results and make available technical literature with proven use details.

Proceedings of second prestressing congress

The Cement and Concrete Association of Great Britain has issued "Proceedings of the Second Congress of the Federation Internationale de la Precontrainte (International Prestressing Federation)". The 990-page book, over two and a half years in preparation, treats new developments in prestressed concrete since the First Congress in 1953.

The proceedings include all papers, general reports, discussions, and other congressional communications in the language in which they were presented at the 1955 congress—French, English, or German.

The book covers such topics as the function of grouting and anchorages in the behavior of prestressed elements; experience and problems concerning the manufacture and use of steel for prestressing; progress of precast, prestressed work in the factory and the assembly, by prestressing on the site, of precast units. It also discusses moment distribution in statically indeterminate prestressed structures beyond the elastic phase; and the influence of plasticity on the strength and instability of thin prestressed shells.

Post-free copies of the book may be obtained by sending a $15 check payable to the Cement and Concrete Association, and addressed to Federation Internationale de la Precontrainte, Terminal House, Grosvenor Gardens, London, S. W. 1, England.

Concrete pouring for a prestressed Amdek box girder—64 feet long, 3 feet wide, and 33 inches deep—takes place on the huge outdoor casting bed of the Concrete Products Division, Buffalo Crushed Stone Corp., Lancaster, N. Y. The hose connection, outside the casting bed, is part of a vacuum system assuring proper placement of concrete and easy form removal.

Concrete-pipe producer adds prestressing work

A new venture, which shows promise of being a large part of the business of the Concrete Products Division of Buffalo Crushed Stone Corp., is the manufacture of prestressed-concrete products. This reinforced-concrete-pipe producer has recently opened a $500,000 plant on a 110-acre site in Lancaster, N. Y., near the Buffalo, N. Y., headquarters of the parent firm. The new plant will serve customers within a 100-mile radius.

On a huge outdoor casting bed, which looks like a narrow-gage railway track, forming, stressing, and concrete pouring operations follow an orderly sequence. Concrete is consolidated with vibrators to assure uniform coverage of all areas and a smooth, even surface.

At the plant, a number of beams can be handled on the same bed with the same cable setup. A vacuum system is employed to assure proper placement of concrete.

Theory and design data on prestressed concrete

The basic principles of all types of prestressed-concrete structures are contained in Part I of "Prestressed Concrete: Theory and Design", by R. H. Evans and E. W. Bennett. In this section, theoretical principles are established wherever possible, and examples are provided for the student to work out.

Part II deals with the design of simply supported beams and is aimed at bridging the gap between principles and practice. The maximum possible use is made of formulas, tables, and graphs. The last part introduces some of the more specialized types of prestressed structures: composite construction of prestressed and in situ concrete; statically determinate structures; indeterminate structures; liquid-retaining structures; and domes and shells.

The $10 book may be purchased from John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y.

Toll revenues on the New York State Thruway during June amounted to $743,745.67.

Concrete research papers in three HRB bulletins

"Prestressed Concrete Pavement Research", Bulletin 179; "Continuously Reinforced Concrete Pavement: Full-Scale and Model Tests", Bulletin 181; and "Instrumentation for Measuring Characteristics of Concrete", Bulletin 176, are available from the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C.

French and British procedures in the design of prestressed pavements are reviewed and compared with those used in the United States, in Bulletin 179. This bulletin also describes the design and testing of experimental prestressed-concrete slabs for highway pavements, and describes model studies of prestressed rigid pavements for airfields. This bulletin costs $1.20.

Certain design principles, based on experience gained from existing continuously-reinforced-concrete pavements, are proposed in the first paper in Bulletin 181. The second paper is a preliminary report on the construction procedures and investigatory details of experimental continuously-reinforced-concrete pavements constructed by the Pennsylvania Department of Highways. The price of this bulletin is 60 cents.

A standardizing strain gage for measurements requiring long-time stability, calorimeter-strain apparatus for study of freezing and thawing concrete, and the AE-55 indicator for air in concrete are all discussed in Bulletin 176. It is priced at 60 cents.

Revised safety manual issued by the AGC

The fifth revised edition of the "Manual of Accident Prevention in Construction" has been published by The Associated General Contractors of America. For the first time, the edition has been printed in loose-leaf form to permit frequent additions and changes in the future.

Sections on explosives, concrete construction, scaffolding, power tools, and marine equipment have been enlarged and brought up to date. A section on powder-actuated tools has been added, and the section dealing with highway construction has been enlarged in scope. Numerous illustrations, tables and charts have been added.

Copies of the manual are priced at $3.25 each, plus postage, and may be purchased from the AGC, 20th and E Streets N. W., Washington 6, D. C.

Gardner-Denver names winners of slogan contest

To spark off its coming Centennial in 1959, the Gardner-Denver Co., Quincy, Ill., recently sponsored a slogan contest, open to company employees and their families around the world. First prize—10 shares of company stock—was awarded to John H. Bent of Fullerton, Calif., engineer at the West Coast fabricating division, for his slogan, "Equipment Today for the Challenge of Tomorrow". Cash prizes of $50 each were awarded to ten other finalists.

A RECORD for long-distance shipment of prestressed piles is claimed by the Precast Prestressed Concrete Division of Ben C. Gerwick, Inc. The piles, 18 inches octagonal and 70 feet long, were shipped from Richmond, Calif., to Kuwait in the Persian Gulf. They are to be driven as test piles at Kuwait prior to the production of such units at the site. According to the company, shipping from Richmond will save considerable time over the alternative of waiting for bed installation at Kuwait and casting test piles there.

Opening session of the Congress was held in the main auditorium that seats 1,252.

Delegates from 44 countries attend prestressed conference

After meeting in London (1953) and and Amsterdam (1955), the Federation Internationale de la Precontrainte (FIP)—or, as phrased in English, the International Prestressing Federation — chose Berlin as the site for its Third International Prestressed Concrete Congress.

Some 1,198 registered delegates from 44 countries, including 79 persons from the United States, assembled May 5 through May 10 in West Berlin's new Congress Hall, which was built only last year under the sponsorship of the Benjamin Franklin Foundation, a German-American body.

The principal business of the week's gathering was conducted in four working sessions. Each session had its particular theme, as follows:

I. Developments in Design Methods;

II. Progress in Prestressing Technique as Applied on the Site, with special reference to grouting, anchorages, reduction of friction, and safety precautions;

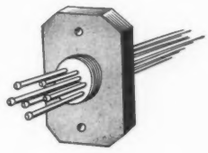
III. Progress in the Manufacture of Factory-made Precast, Prestressed-Concrete Units, and in Their Use and Assembly on the Site;

IV. Short papers on structures executed wholly or partly in prestressed concrete since the 1955 Congress, and embodying important developments in design or construction.

Well in advance of this Congress, authors from 20 countries prepared 62 papers (including four from the United States) for the first three ses-

Berlin gathering discusses development in design methods; site techniques; factory-made prestressed-concrete units

by WILLIAM H. QUIRK
editor



Presiding at Session IV is Prof. T. Y. Lin of the Civil Engineering Dept., University of California. Peter Misch (Germany) secretary of the Congress, is to the right.

sions — 24 papers on Theme I, and 19 each on Themes II and III. Material on Theme or Session IV was not prepared in finished form before the meeting.

The formal papers were made available to members of the Congress months before the meeting, so that they might have the opportunity of discussing them in Berlin at the working sessions. Copies of the prepared papers were also distributed to delegates as they registered at Congress Hall. Papers could be written in any one of the official languages of the Congress — German, English, French, or Spanish — and were printed in the original language in which they were submitted.

At the Congress, the language problem was handled by a staff of 12 translators, three for each of the official languages. They sat in soundproof booths at the rear of the auditorium, listening with earphones to the speaker on the platform. They translated his words into a microphone, split seconds after they were uttered. Each of the 1,252 seats in the big convention hall was equipped with a plastic earphone. A four-way switch on the arm of the seat permitted a selection of any of the four languages. The almost simultaneous translation enabled the delegates to follow the speaker closely, and was especially helpful when slides were being explained.

At each working session a General Reporter first covered the main points contained in the papers submitted. Delegates who had themselves submitted papers were then given an opportunity to comment on other papers, insofar as these were referred to in the general report. A general discussion, limited to points covered in the report, followed. Then authors whose papers were discussed were given an opportunity to reply. Finally, the General Reporter summarized the results of each working session.

Development in design methods

Hubert Rüsch, a professor at the Technische Hochschule in Munich, was General Reporter at Session I—Developments in Design Methods. Papers on this subject dealt with the

(Continued on next page)

At the opening-day session on the rostrum were, from left: Hans Minetti (Germany), president of the German Concrete Assn.; Eduardo Torroja (Spain), president of the FIP; Willy Brandt, Mayor of Berlin; Philip Gooding (Great Britian), general secretary, FIP; Rolf Schwedler, senator for building and housing, Berlin; Peter Misch, secretary of the Congress.

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dimensioning of prestressed-concrete structures under the action of compression, bending, shear, and torsion. A few also covered special structural forms and the consideration of prestress in building codes.

A contribution from the United States under the above theme was a paper by Dr. Rene Walther of Lehigh University, Bethlehem, Pa. He suggested a method for estimating the ultimate load of concrete beams from the stresses corresponding to the rotational deformations of the failure section about the neutral axis. This method was offered as an improvement on the empirical approach, and its theoretical predictions were reported to concur fairly well with test results. The theory is related to prestressed and web and compression reinforced-concrete beams.

In his general report, Professor Rüsch noted that all authors agree that shear failure is produced by the joint influence of moment and shearing force, and that the present method of dimensioning for each force acting separately has to be abandoned in any case. He also pointed out that shear failure is closely related to the flexural failure; that is to say, in both cases the rupture is brought about by the overcoming of the tensile strength. With flexural failure, this usually happens because of yielding of the steel; with shear failure, through diagonal cracking of the concrete. In both, the failure will be completed in the same way—by crushing the concrete. This compressive failure, according to the report, can occur in different places.

In summarizing, Professor Rüsch stated that the problem of prestressed concrete farthest from a solution is still shear strength, but although a final solution has not yet been found, the existing experimental results and hypotheses of failure do permit engineers to design safely.

Some of the forms under discussion in this session included shells, pressure tunnels, and bridges. A paper by four delegates from the U.S.S.R. described the building codes in Russia applying to the design of prestressed structures. Professor Andre Paduart of the University of Brussels compared specifications laid down in various countries. He also proposed an international unification of specifications for prestressed structures, and invited critical comments in order that the extent to which such a unification is already possible may be revealed. His proposal was given general support.

Progress in site techniques

For Session II, Gerrit F. Janssonius served as General Reporter. From Amsterdam, Mr. Janssonius is chief engineer of bridges in the Public Works Division. Under the theme of Progress in Prestressing Technique as Applied on the Site, the papers and discussion covered grouting, friction, anchorages, steel, and glass fiber.

The General Reporter, in reviewing the papers, stated that the quality of grouting does not always conform to the anticipated service life of the structure. Also, that in the sphere of post-tensioned prestressed concrete, the improvement of the quality of grouting is therefore still an urgent problem.

One paper called attention to the main objectives of grouting as being:

a. to protect the prestressing steel against corrosion and thus to increase the durability of the structure;

b. to increase the ultimate strength by producing the best possible bond between the prestressing steel and the surrounding concrete.

This same paper, prepared by the

Netherlands Committee on Grouting, formulated the following five requirements which the grout must fulfill after hardening:

1. It must fill the ducts.
2. When set it must adhere closely to both the steel and the inside walls of the ducts.
3. Its compressive strength must be adequate.
4. It must not, a few days after setting, swell at low temperatures.
5. It must not corrode the steel.

From the papers dealing with friction, Janssonius concluded that there are, in the main, three places where friction may occur: in the jack; possibly in the anchorage device; and between the prestressing steel and the wall of the duct. He also gave as his opinion that the only really satisfactory cables are those which turn through as small an angle as possible, and he strongly deprecated the use of cables which curve sinuously in two directions.

Four papers reported on new types of anchorages. One discussed 200-foot cables provided with a "blind" anchorage at one end. A cable of this kind has a capacity of up to 1,400 tons and is used in the construction of large dams. Projects now in the planning stage envisage cables that can be stressed up to 2,500 tons each.

Another described an anchorage device used in conjunction with a new type of prestressing cable. This 65-ton cable comprises seven strands, each of which is composed of seven wires of 3.6-mm diameter. The anchorage consists of a hollow barrel with seven internal wedges. When the barrel is forced over the wedges, the strands of the cable are pressed into the wedges (which undergo a certain amount of plastic deformation and thus take an imprint of the strands). The force exerted by the cable is taken up by the wedges and transmitted to the concrete through a bearing plate. This method requires a special double-acting jack. The two functions of the jack are tensioning the cable and effecting the anchorage.

With reference to the 65-ton cable just mentioned, the General Reporter pointed out that because of its flexibility it was easy to install; also, that the high quality of steel associated with the use of these small wire diameters is a considerable advantage. Further, owing to the low apparent modulus of elasticity, the effect of shrinkage and creep of the concrete is less than with other types of cable. The sheath used with this flexible cable is a rigid, thin-walled steel tube.

Another type of material for prestressing, made of glass fiber, was treated comprehensively in a paper by Stanislaw Kajfasj of the Polish Academy of Science in Warsaw.

Factory-made units

Dudley H. New, chief structural engineer, Holland & Hannen and Cubitts Ltd., London, served as General Reporter for Session III—Progress in the Manufacture of Factory-made

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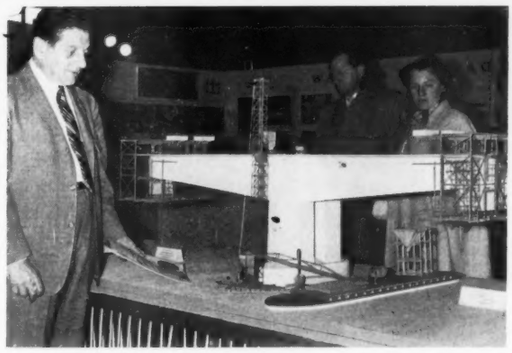
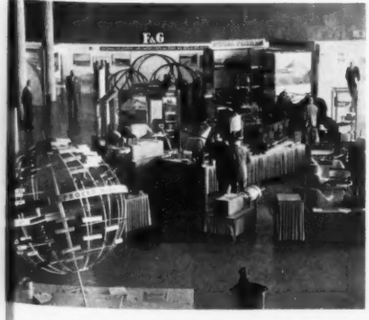


Ernst Gruenwald (U.S.) examines model showing construction of prestressed bridge. Gruenwald is manager, "Incor" and Technical Service, Lone Star Cement Co., New York, N. Y.

LARGEST OF ITS KIND IN THE WORLD, reportedly, is this huge earth-drilling machine, weighing 70,000 lbs. Recently used on the Portola Drive widening project in San Francisco, it was developed by Fred Pavlow, owner of P & Z Co., South San Francisco. Pavlow said the machine is ready for work 15 minutes after wheeling up to the job site and drills piling holes as large as eight ft. in diameter, at any angle and more than 100 ft. into ground.



Some 20 manufacturers were represented at the Exhibit. Freyssinet exhibit with globe in foreground.

(*Continued from preceding page*)

Precast, Prestressed-Concrete Units, and in Their Use and Assembly on the Site. Three delegates from the United States contributed papers on this theme.

Harold A. Price of Basalt Rock Co., Napa, Calif., and vice president of the Prestressed Concrete Institute, discussed "The Current Status of the Art of Prestressing as Practiced by American Manufacturers". His paper dealt mainly with the production of standard units on the fully bonded long-line process, particularly double-tee units, prestressed with 7-wire strands. The demand for these units has increased so rapidly that now nearly 200 factories are engaged in their manufacture. Mention was made of the difficulty in controlling differential camber between similar units, a matter which is, of course, of considerable concern to all manufacturers. The paper stated that in order to reduce the number of skilled men needed, there is a move in the interest of economy for post-tensioning generally to replace the long-line process. This has not been suggested from any other country.

As to bridge beams, Price gave details of hollow bridge beams, and mentioned the deflection upwards at the ends of tendons in fully bonded beams. He stated that post-tensioned beams are prestressed with screwed rods, Freyssinet cables, or wires with button heads.

He also mentioned prestressed piling of hollow section, the holes being formed with cylindrical fiber-board tubes that remain in the concrete, or by inflated rubber tubes. He stated that seven-strand tendons are invariably used for prestressing fully bonded piles. Post-tensioned piles of large diameter are made up from precast concrete cylinders prestressed together.

Ben C. Gerwick, Jr., of Ben C. Gerwick, Inc., San Francisco, and president of the Prestressed Concrete Institute, described "Plant Manufacture of Large Pretensioned Bridge Girders". In his general report, New observed that Gerwick made the point that, in view of the big handling problem involved in moving heavy bridge beams in the factory, it has been found more economical to manufacture a number of single beams side by side on a short wide bed than to use the long-line process. The practice of deflecting a proportion of the fully bonded tendons upwards toward the end of beams by the use of suitable anchoring devices was discussed. Mention was made of accelerated curing by placing well built insulated steam hoods over the units; this was found to give much improved results when compared with curing under canvas or tarpaulins.

Gerwick also dealt with the construction of bridge girders up to some 85 tons in weight and 36 meters in length, prestressed by the fully bonded method. Some details of the transport of long and heavy girders were given, including ocean tow on barges.

Eugene M. Smith of the Freyssinet Co., New York, prepared a paper on "Precast Prestressed Construction in the U.S.A." He discussed the growth of prestressing in the United States and the advantages of precast concrete as compared with cast-in-site construction. Details were given of a typical plant for producing units by the long-line process.

From the papers offered, Reporter New concluded that advances in prestressed concrete seem to be in the increase of size and weight, and in the elaboration of existing methods, rather than in the development of entirely new techniques. He pointed out that there are still many problems on which there is still much development work to be done before spectacular advances in other directions are likely to be made. These problems include development of bond, vertical stresses in the ends of a beam, joint conditions between adjacent elements, formation of economical and satisfactory bearings, the elimination of differential camber, and continuity over supports.

New also said that it appeared young engineers are giving great thought to the matter of economy in points such as the elimination of transverse stressing in bridge work; the avoidance of end blocks in beams produced on the long-line process; and methods of handling members in the factory and at the site. The most recent development mentioned, according to New, was that of the use of high-strength polyester resin in the joints between structural members made up by prestressing together a series of prestressed units.

Prestressed structures since 1955

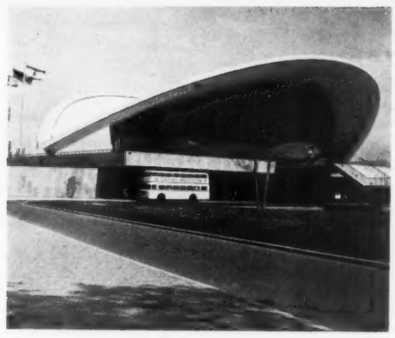
Working Session IV consisted of short papers on structures executed wholly or partly in prestressed concrete since the 1955 Congress, and embodying important developments in design or construction. Two periods were given over to this theme, with Fernand Dumas as General Reporter. M. Dumas is chief engineer of bridges and roads in the French Ministry of Public Works. He cited the evident development of prestressed concrete over the entire world from the 109 reports from 31 countries, covering 800 construction projects, that were submitted for this particular session. These reports described all types of work including bridges, runways, tunnels, silos, underground containers, cooling towers, chimneys, dams, piers,

caissons, railway sleepers, buildings of all kinds, piles, etc.

According to the reporter, the reasons for this increase in the use of prestressed concrete are economy in price and material; reduction of maintenance cost; higher strength compared with normal reinforced concrete; resistance against impact, earthquake, and hurricanes.

One of the papers from the United States included in this session described "Offshore Structures on Prestressed-Concrete Cylinder Piles". It was presented by Tomasz Plodowski, an engineer with Raymond International, Inc., New York. The structures mentioned are designed and built for use in off-shore drilling for oil. In comparison to land construction, the materials employed in offshore structures, according to Plodowski, require better properties because they have to resist corrosion, chemical action due to continual submersion in water, effects of alternating submersion and drying, and mechanical action of waves, currents, floating objects, etc.

The author pointed out that with the development of prestressed concrete and the Raymond prestressed-concrete cylinder piles, the field of concrete application has widened considerably. "We can now build", he said, "a unique type of structure which has not before been possible. These structures are built under widely varying conditions. In each location the ocean floor will be different, and wave forces vary from 9-foot maximum waves in Lake Maracaibo to 40-foot waves and 125-mph hurricane winds in the Gulf of Mexico. Earthquakes and high vibrations during drilling must also be taken into consideration."



West Berlin's new Congress Hall where the Third International Prestressed Concrete Congress was held May 5 through 10. The flag of the Federal Republic of Germany is flanked on either side by the flag of Berlin with its symbol of a bear.

Using slides, the Raymond International engineer described a 4-pile drilling platform in Lake Maracaibo, Venezuela. This structure, one of the simplest of its type, is designed for a water depth of up to 120 feet. The pile is a hollow cylinder, made up of 16-foot lengths that are placed end to end and held together by cables of steel wire. The pile has an outside diameter of 54 inches and a 5-inch wall. Each pile has 24 prestressing cables, and each cable is made up of twelve .192-inch-diameter wire. Piles extend about 7 feet above the water; their upper ends are held together with a welded structural framework. Plodowski also described three other larger types of structures in various off-shore locations.

Prestressed convention hall

The Berlin Congress Hall, where the meeting was held, was a good example of prestressed construction for the delegates to study. The supporting elements of the roof are the two arches which encircle the saddle-shaped roof area, and the ring that subdivides it into the inner rotation-parabolical sector above the auditorium and the outer sector between ring and arches. The span of the arches is 78.06 meters (256 feet); their inclination to the horizontal is 28.4 degrees.

Not counting ring and stiffening strips, the shell has a thickness of 7 cm (2¾ inches). It is prestressed transversely to its longitudinal axis. All prestressing elements are tensioned from the ring or from its stiffening, respectively, this being done separately for the inner and outer sectors of the ring. The arches and the ring stiffening transmit their load to the two abutments. Each abutment is supported on a foundation grill of 52 Franki piles.

Between sessions of the Congress, tours were arranged for the delegates to visit various prestressed-concrete structures and construction sites in both East and West Berlin. These included several bridges and flyovers, buildings, a sewage purification plant with eight prestressed sludge tanks,

(Continued on next page)

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stations on the Berlin underground railway (U-Bahn), and the concrete works at Grünau, belonging to VEB Betonwerke.

Prestressed exhibit

During the week of the meeting, manufacturers of prestressing equipment displayed their products in the exhibition room of Congress Hall. The area available for this showing totaled 1,070 square yards. About 20 German and foreign firms displayed models and photographs of their prestressing methods.

When sessions were not in progress, films were shown either in the main auditorium or in the theater of the Congress Hall. Each film was shown twice during the week. The films were made in Soviet Russia, Germany, India, Austria, Mexico, and Italy, and presented some phase of prestressing in those countries.

Of the 1,198 registered delegates, a dozen countries sent 1,032 of the total. The other 166 attending came from the remaining 32 of the 44 countries represented. The host country, Germany, had 471 delegates from both its east and west political divisions. Other countries with sizable delegations included Great Britain, 118; U.S.A., 79; France, 56; The Netherlands and Switzerland, 49 each; Austria, 45; Sweden, 44; Italy, 34; Belgium, 33; Denmark and Spain, 27 each.

Of the 62 formal papers, 26 were presented in the English language; 20 in German; 13 in French; and 3 in Spanish. The 26 papers in English included not only those originating in English-speaking countries, but also three from Netherlands delegates, two from Denmark, two from Poland, and one each from Spain and the Soviet Union.

The Fourth International Prestressed Concrete Congress will be held in 1962, but the location for the meeting has not been selected.

THE END

Construction in Hawaii is now at its highest level since World War II, and further increases are expected. Altogether, those employed on projects in the territory number 11,030. This is 1,200 more than were employed a year ago.

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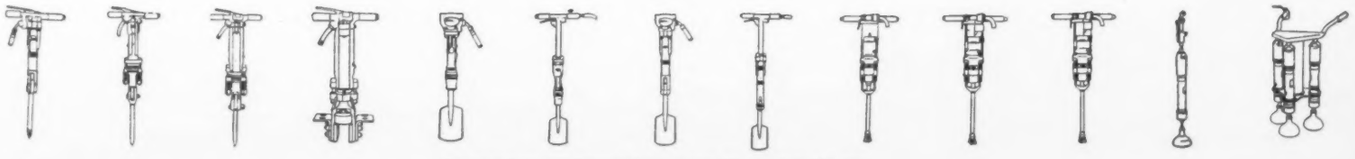

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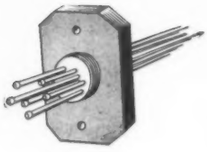


Expanding market

for prestressed components means

Expanding prestress plant

Continual expansion of its facilities has given Florida Prestressed Concrete Co., Inc., Tampa, Fla., a commercial plant setup capable of producing about 10,000 linear feet of prestressed or precast components. The plant's 12 working beds of various lengths have been built for flexibility so that changes in the normal production of the various casting beds can be made.

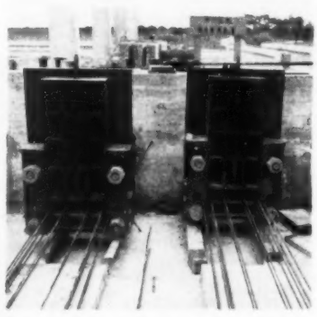
Overhead crane setup

The two 400-foot-long girder casting beds — each with four rows for Type II and Type III girders — are served by two overhead gantry cranes riding on column-supported prestressed girders. Type II girders span the 2-foot 6-inch × 20-inch precast columns, which are spaced on 25-foot centers along the outside of the parallel beds. The columns are 28 feet high.

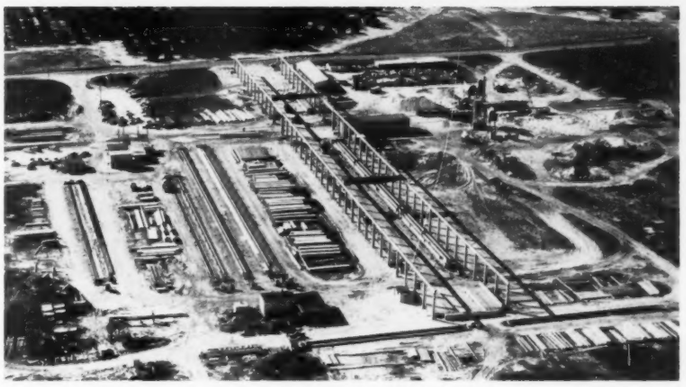
A 48-foot span was required in each row to provide clearance for a railroad spur servicing the company's batch plant and to permit direct loading of completed girder sections onto rail cars for shipment. To span this distance, Florida Prestressed used a pair of Type II girders to support the track of the gantry.

Two 15-ton electrically operated gantry cranes, spanning the 75-foot distance between the column rows, are used for all kinds of work from stringing the pretensioning strands to pouring concrete.

The two universal beds vary in width — one is 12, the other, 15 feet wide. The smaller is used for Type II girder pours and the larger for Type III girders. The area spanned by the gantries is wide enough to per-



Special header strand plates developed and built by Florida Prestressed make it possible to thread strands in any combination. Four tie bars connect each header plate to the push-plate, which is on the opposite side of the concrete-encased anchor column.



Dominating the view of Florida Prestressed Concrete Co.'s yard from the air is the overhead gantry setup. Gantries ride column-supported prestressed girders as they serve two 400-foot-long girder beds. The overhead setup spans the railroad spur serving the batch plant, right. Other beds, left, give the yard a capacity of 10,000 linear feet of prestressed units.

Florida Prestressed Concrete Co.'s smooth-running commercial operation is well equipped. Europa or Reliable strand vises fasten strands to header plates. Rodgers 200 and 300-ton jacks, used to put tension on the strands, are powered by Rodgers pumps. A Koehring crane is used to bring aggregates to the Blaw-Knox batch plant that supplies concrete for the yard. Watco steel forms, furnished by Plant City Steel Corp., Plant City, Fla., are being used, and pours are being vibrated by Vibro-Plus units. Miscellaneous lifts around the yard are being handled by an Austin-Western hydraulic crane.

mit the addition of up to three more casting beds if necessary.

Florida Prestressed developed and built special header strand plates so that prestressing strands can be threaded in any combination. Strands are fastened to these plates by strand vises. Four steel bars tie the header plate of each row to the push-block on the opposite side of the concrete-encased steel anchor column.

Florida Prestressed uses 200 and 300-ton hydraulic jacks to stress the pretensioning strands for the casting beds. The jacks are all powered and operated from a centrally located pump house. This power can be transmitted to any of the beds through hydraulic lines buried between the beds and pump house.

While the movement of jacks in the

(Continued on next page)

Concrete is chuted from a transit mixer on a Mack truck to Plant City's Watco steel double-tee forms. Vibro-Plus units consolidate the mix. The firm has enough beds to pour a 400-foot run of 14-inch double-tee beams and a 280-foot run of 16-inch double-tee beams.

For more facts, circle No. 253→

(Continued from preceding page)

All concrete for work at the yard is turned out by this Blaw-Knox plant. The aggregate bin is being charged by the Koehring crane. The 400-barrel cement silo is kept full by under-track hopper, screw conveyor, and enclosed bucket elevator.

girder bed area is handled by the overhead cranes, Florida Prestressed uses a hydraulic crane to handle most of the miscellaneous lifts throughout the yard. A few jobs of this versatile and fast-moving rig are to position jacks from row to row of a casting bed as well as between casting beds; to strip and position side forms; and to pull strands from the dead to the live end of a bed.

Concrete plant

Supplying concrete mix for the prestress yard is a pair of batch plants on each side of the railroad spur serving the yard. Generally, one plant is used by the prestressing operation while the other supplies mix to the contracting company affiliated with Florida Prestressed. A crane charges the plant with aggregate and sand from the surrounding stockpiles. Two transit-mix trucks, with 4 and 5-yard capacities, bring the mix to the casting beds.

In the girder bed area, the mix is chuted into concrete buckets handled by the overhead cranes. Elsewhere, the transit mixers chute the concrete into the fabricated steel forms. The transit-mix trucks can be used to place the concrete in the girder forms if there is room between the two beds. This will not be possible in the future when Florida Prestress adds more beds in this area.

This Austin-Western hydraulic crane is moving forms right now, but the rig is used for plenty of other work in the yard—including moving jacks and strand reels.

Casting breakdown

The dozen casting beds at the prestress yard have the following capacities:

Number of rows	Length of rows	Type of component
5	150 feet	14-foot joists
5	150 feet	10-inch joints
4	400 feet	Type III girder
4	400 feet	Type II girder
3	400 feet	18-inch piling
3	400 feet	18-inch piling
1	400 feet	14-inch double-tee
5	300 feet	10, 12, 14-inch piling
1	280 feet	16-inch double-tee
1	280 feet	4-foot flat slab
1	280 feet	3-foot-wide, 4-inch-high roof slab
1	55 feet	utility bed for misc. forms

The company's prestress operations, headed by superintendent William T. Cooper, have continually expanded in the last few years because of the increase in prestressed components required on state projects. Florida has been pioneering the use of prestressed bridge members, and more and more of them are being specified in highway contracts. This is one of the prime reasons that many Florida contractors are studying prestressing operations and setting up their own plants. And as engineers and contractors become familiar with the techniques, the rest of the country will be following Florida's lead.

THE END

Toll-road revenue on the Massachusetts Turnpike hit the $1 million mark in June. This is $100,831 more than toll collections for the same month last year.

Labor review

New Jersey labor troubles subside at last as roofers come to terms

Work on building projects in Bergen County, N. J., resumed last month after an eight-week strike by Roofers Local 10 against members of the New Jersey Roofing Contractors Association.

The roofers were the last of several trades to come to terms, and the settlement marked the end of a turbulent period that saw walkouts at various times by carpenters, bricklayers, and laborers in the state's northern counties.

The roofers struck for a 40-cent wage raise in a one-year contract; they came back to work for 50 cents over a three-year period. Under the union's old agreement the journeyman scale averaged $3.80.

Pipe fitters and contractors in Houston area reach tentative agreement

A "memorandum of agreement" between Pipe Fitters Local 211 and contracting groups in the Houston area provided a 25-cents-hourly wage package over a two-year period. The remainder of the contract was suspended until reviewed by a joint session of attorneys for both the contractors and union groups.

The memorandum provided for a wage increase of 12½ cents hourly effective immediately, which brought the pipe fitters' rate to $3.67½. Another 12½ cents an hour will become effective July 1, 1959. The contract will expire June 30, 1960.

No fringe benefits were involved in the new agreement, according to an employers' association spokesman, although there is a 2½-cents-hourly apprentice fund payment.

The new settlement with the Pipe Fitters may well set the pattern for the Galveston City area, and it will probably affect negotiating patterns in the southern Gulf Coast area as well, the spokesman for the employers' association said.

Pennsylvania ironworkers get pension fund, hourly pay hike

A new two-year contract between Iron Workers Local 3 and the Iron Workers Employers Association of Western Pennsylvania established a pension fund for some 2,360 union members and raised their hourly pay 20 or 25 cents, retroactive to July 1.

Structural workers got the 20 cents, which brings their hourly scale to $4; rodmen got the quarter and a new scale of $3.82½. In addition, employers are paying 10 cents more hourly per man for pensions.

Rule company not entitled to recover for wages increased under the Davis-Bacon Act

The United States Court of Claims ruled that the Bushman Construction Co. is not entitled to recover from the United States the increased cost of wages resulting from a redetermination of prevailing minimum wages by the Secretary of Labor under the Davis-Bacon Act.

The decision turned on the point that the contract awarded to Bushman by the government contained a provision that proceedings were pending for a redetermination of Davis-Bacon rates for the area in which Bushman contracted to do the work required by the government. The work was part of the Missouri River Basin project. The provision said that any new rates would become the applicable minimum for work performed thereafter under the specifications for the job.

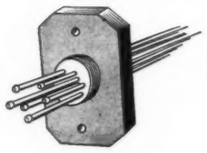
Bushman argued that the Davis-Bacon Act requires only that the contractor should pay the minimum wages found by the Secretary to be prevailing in the community at or before the time of execution of the contract, and does not authorize a provision for the payment of a higher wage if the Secretary later determines that the higher wage then is prevailing.

The court agreed with this view of the law, but added the following statement:

"From this premise, however, plaintiff draws the conclusion that any such provision in a contract is unlawful. This conclusion is wrong. It is wrong because the Davis-Bacon Act was not enacted for the benefit of the contractor, but for the benefit of the contractors' employees, to insure that they receive at least the standard wages prevailing in the community. . . . A violation of that Act, therefore, gave to the contractor no right of action. . . ."

Girders, 96 feet long, are post-tensioned for bowling alley roof

The skeleton of a 96-foot-long girder for the roof of the bowling alley in the Great Southwest Sports Center has ten cables strung between bulkheads of wood. Bulkheads are backed by steel angles. Tendons of each cable are wrapped in creosoted paper to keep them from bonding to the concrete.



Big, even by Texas standards, are the 96-foot post-tensioned concrete girders that support the roof of a unique one-story building—the Great Southwest Sports Center in the Dallas-Fort Worth area.

In addition to the giant girders, the $1 million bowling alley uses precast and prestressed concrete for the roof and exterior walls.

The walls are made up of vertical prestressed panels up to 24 feet in height. With a brush finish on the outside and a painted surface on the inside, the 5½-inch-thick panels form the completed wall. All roof members are of precast concrete. Spanning the 39 feet between the girders are concrete joists which support the 6½×2-foot roof channels.

The 32-lane bowling alley was recently completed by the Great Southwest Corp., Dallas, as the initial unit in a 293-acre Sports Center. This center is an integral part of a 5,000-acre industrial development located at about the mid-point of the Dallas-Fort Worth Turnpike.

In its comprehensive plan, Great Southwest Corp. not only provides companies with ideal plant sites but gives the expected 150,000 workers nearby places to shop, eat, and play. The industrial district will have three community centers with restaurants, office buildings, hotels and motels, drive-in shopping, and a chapel. Workers will live in neighboring towns. Industry in the district will be served by a million-square-foot warehouse—now under construction—and a consolidated motor freight terminal.

At the Great Southwest Sports Cen-

Prestressed wall panels for the exterior walls are lifted with a four-point hookup and set in place. Panels have eight ⅜-inch strands stressed to 14,000 pounds. Supplied and erected by Span, Inc., Dallas, they are 4 feet wide, 5½ inches thick, and up to 24 feet high.

Girders support precast-concrete joists, roof channels; prestressed panels are used for walls of unique building

Girders are formed one at a time on the concrete floor adjacent to the columns. A water seal keeps them from bonding to the floor. Concrete is bucketed from a transit-mix truck to the girder form by a P&H crane.

ter, workers as well as the general public will be able to put their money back into circulation in a variety of painless ways. A worker will be able to bowl a few strings at any one of the 32 alleys and buy anything from tennis balls to a sports car in the 100,000-square-foot retail store soon to be built on the site. If a buyer wants to test his shotgun before buying it, he will be able to blast away on the nearby rifle range.

Other facilities for demonstrating and testing equipment will include casting ponds, a boat lake, and a skin-diving pool, plus skeet, pistol, and shotgun-patterning ranges. Name it and they've got it—a quail run, a moving deer target range, archery and driving ranges, and camping equipment areas.

The center will also have a large area known as the Great Southwest Land, with miniature towns, Indian encampments, stagecoach routes, and other scenes depicting the history and heroes of the old Southwest. The park is Texas' answer to California's Disneyland.

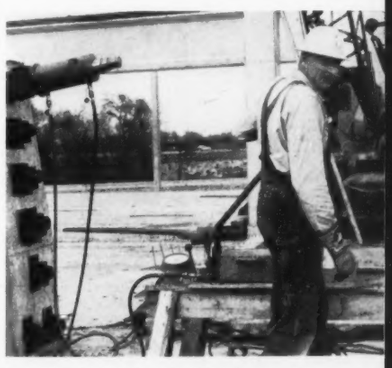
But to the men working on the bowling alley, the place was hardly an amusement area. Before they could knock down any pins, they had to put up a big building.

Big girders produced

One of the biggest jobs was to manufacture and erect the post-tensioned concrete girders that span the width of the 98×269-foot bowling alley. The six girders were formed and poured one at a time on the concrete floor at the base of the columns.

(Continued on next page)

Another of Armour's Macks dumping asphalt paving material. The combination of Mack's Balanced Bogie with Power Divider and the 20-speed transmission makes these trucks unexcelled for the roughest off-highway hauling, yet gives them the flexibility needed for open road operation.



Post-tensioning is completed on this girder by a hydraulic ram. The bottom cables are stressed to 137,000 pounds. The rest, with 14 tendons, are stressed to 120,000 pounds. Steel plates hold the head of the cable out from the girder and maintain the tension.

For more facts, use Request Card at page 18 and circle No. 256

A Manitowoc 40-ton crane and a Lorain 35-ton crane team to lift a 64-ton girder into place on the columns. Ends of girders cover half the 2-foot-square tops of columns. A poured-in-place section will tie each column to the girder.

(*Continued from preceding page*)

Each I-shaped girder is 96 feet long, 6 feet 8 inches deep, and weighs 64 tons. One of the first steps in making a girder was the positioning of the ten cables to be tensioned. The cables, instead of being contained by flexible tubing, were wrapped with creosoted paper and cast in the concrete. The paper wrapping made it possible for the cables to be stretched after the concrete had set up.

Special forms at each end of the girder held the ends of the heavy cable in position. Built of wood backed by steel angles, the templatelike form contained holes that positioned each cable end. All ten cables hung in an arc that dropped from 2 to 10 inches above the bottom of the girder at the mid-point. The lower pair of cables contained 16 tendons; the remainder contained 14. It was necessary to run cables from the tops of the end forms to concrete anchor blocks to hold the forms in place.

After setting the reinforcing steel, workmen set up 8-foot wooden form sections to enclose the sides of a girder. A 2×4 nailed to the concrete controlled the alignment, and snap ties held the forms together. The girder was kept from bonding to the slab by an application of Thompson's water seal. Only one set of forms was required to pour the six girders.

Since the nearly 7-foot-high girders were too high to pour directly from a transit-mix truck, concrete was bucketed to the forms by a P&H motor crane. After the 5,000-pound concrete was vibrated, it was allowed to cure for a minimum of five days.

In tensioning the cables, two hydraulic rams worked simultaneously to pull each end of the cable about 4 inches out from the concrete. When this was done, two steel plates were set in the gap to hold the tension. The 14-tendon cables were stressed to 120,000 pounds, while each of the two bottom 16-tendon cables was stressed to 137,000 pounds. The tensioning gave the big girders a camber of from ¾ to ⅞ inch.

The cables as well as the tensioning equipment were furnished by The Prescon Corp. of Corpus Christi, Texas, which also assisted in the design of the girders. Responsible for the over-all design of the building are the Associated Architects & Planners of Dallas.

Lifting the 64-ton girders

When the big girders were ready to be lifted to the tops of the 15-foot-high columns, GSC called on the services of Watson Foundation Co. of Fort Worth. It rolled onto the scene with a Manitowoc 40-ton and a Lorain 35-ton motor crane.

Grabbing onto lifting bolts in holes

Luther D. Clark, plant manager for the construction of the industrial district, uses the development plan of the Great Southwest Sports Center as he explains the physical layout.

2-million yard earth-moving job. In Spartanburg and Cherokee Counties, South Carolina, the P. C. Cochran Construction Company of York, S. C. contracted to improve Route 29. They moved over 2,000,000 cubic yards of earth in the process. Photo shows (left to right): Edley Lattimore, General Superintendent; P. C. Cochran, Owner, and H. H. Lane, Gulf Sales Engineer.

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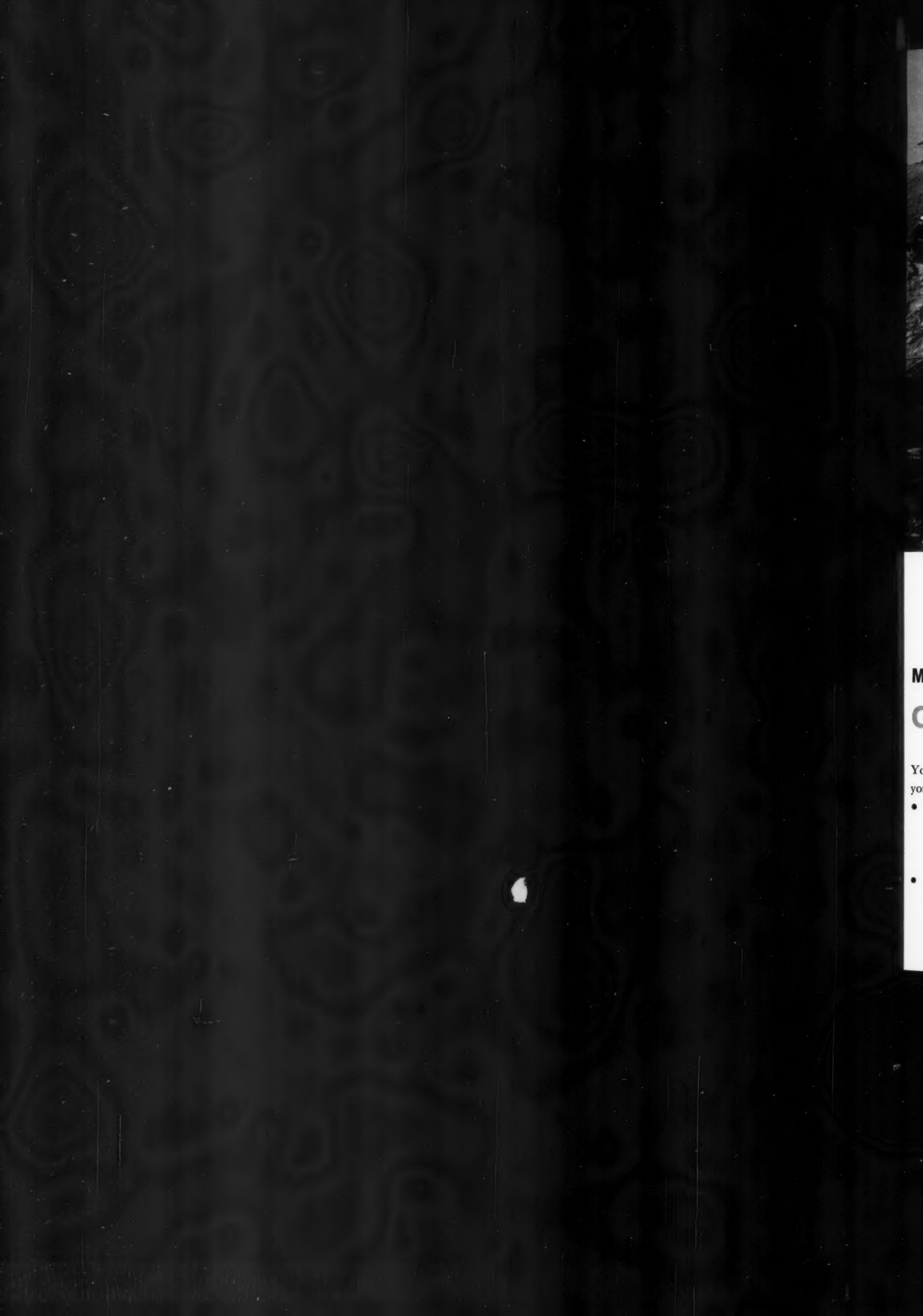

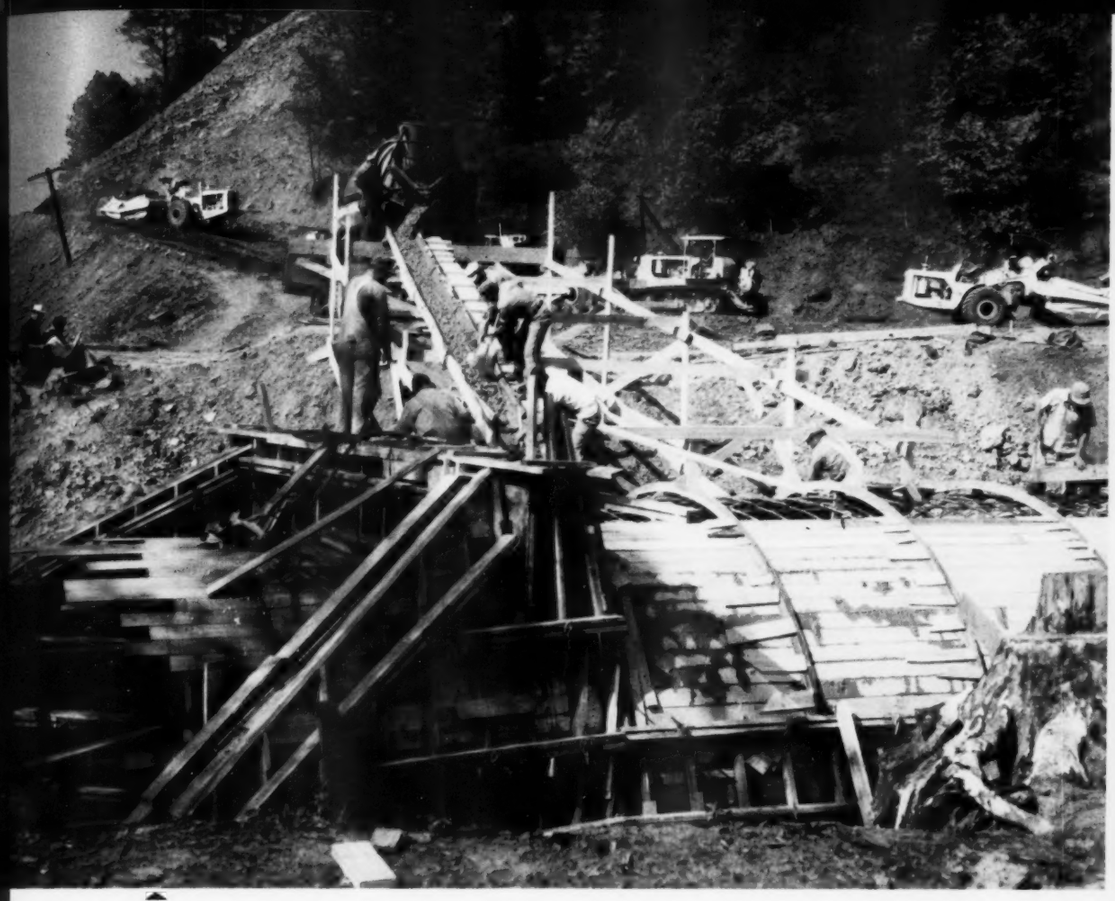

Water barrier goes underground. When a creek obstructs a 3½-mile road project, move the creek! That's what S. Gavlik, Contractor, did to relocate Route 422 near Indiana, Pennsylvania. The project, let under the Federal Highway Program, included three sub-surface concrete structures to carry off surplus water from the creek. Photo above shows concrete being poured for one of the three sub-surface structures. S. Gavlik is a long-time Gulf user.

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Re-routing a route. One of the early jobs to be let under the Federal Highway Act was the relocation of Route 66 at Mamont, Pennsylvania. This job, which involved building an overpass over Route 80, was awarded to Ralph Myers Contracting Corporation of Pittsburgh. In the photo above are H. H. Hossler, Gulf Sales Representative, and Marion Hoke, Superintendent of Ralph Myers Contracting Corporation, on the job site. Myers depends on Gulf products to prevent mechanical delays.

Digging the big ditch, underwater. The South Cornwall Channel, a vital link in the $900,000,000 St. Lawrence Power-Seaway Project, was dredged by S. J. Groves & Sons Company of New York City. Groves removed about 1,800,000 cubic yards. Tug and dragline used clean-burning Gulf diesel fuel.

Expediting excavations. Below: On the huge St. Lawrence Power-Seaway Project one of the many contractors who used Gulf products is the firm of Jack and Jim Maser, Excavators, of Lancaster, Pennsylvania. The photo below shows the late Charles Reynolds, Maser Project Superintendent, with Gulf Jobber John Pellegrino. Jack Nicholson, Gulf Sales Engineer, is at right.

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"We're extremely well satisfied with Gulf. Can't beat the products . . . or the service," says the job superintendent of S. Gavlik, Contractor, of Glenwillard, Pennsylvania. Standing above are (left to right): A. Tietjen, Superintendent; R. S. Garrison, Assistant Superintendent; H. H. Hossler, Gulf Representative; S. Gavlik, General Contractor.

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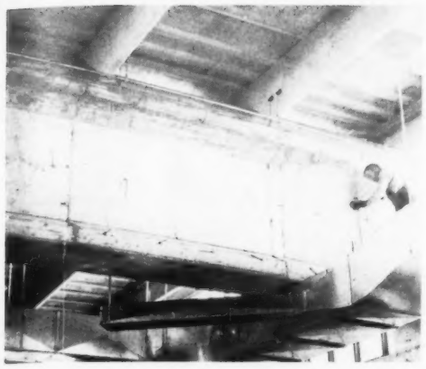


Heating and air-conditioning ductwork is installed beneath the completed roof. Joists, 16 inches deep, span 39 feet between the girders. The 6.5 feet between the joists is spanned by precast-concrete channels that form the roof deck.

at each end, the two cranes inched the 64-ton girder into place. The end of the girder was set on a neoprene pad covering half the area of the 2-foot-square column top. The remainder of the area is a poured-in-place section that ties the column to the girder. The tie-in section, which was poured against the end of the girder, is strengthened by two dowel bars.

All-concrete roof

Spanning the 39 feet between the girders are 16-inch-deep precast-concrete joists on 6.5-foot centers. The joists carry 2×6½-foot precast channels that form the roof deck. The channels are covered with a ½-inch layer of Fiberglas which received a 20-year built-up roof. All precast members were furnished by Texcrete Structural Products Co., Dallas.

Prestressed wall panels

Tall prestressed panels form the exterior walls of the bowling alley. Supplied and erected by Span, Inc., Dallas, the larger panels are 24 feet high, 4 feet wide, and 5½ inches thick. The eight ⅜-inch strands in the big panels are each stressed to 14,000 pounds.

The panels were set in position by a Lorain Moto-Crane, which made a four-point lift on each slab. The lifting eyes were screwed into special anchors cast into the face of the concrete. Each panel was welded top and bottom to brackets and plates cast in the concrete to hold it in place. A plastic sealer tape was used in the lap-type vertical joint between adjoining panels.

Personnel

Great Southwest Corp., headed by president Angus G. Wynne, Jr., is not only planning the development, but in most cases acting as the general contractor as well. Supervising the construction of the bowling alley, in addition to several other buildings going up on the site, is project manager Luther D. Clark. His superintendent is Bill Christensen. THE END

Beaver-Advance appoints

The Beaver-Advance Corp., Ellwood City, Pa., manufacturer of tubular scaffold, shoring, and material-hoisting towers, has appointed Thomas R. King Southeastern district manager.

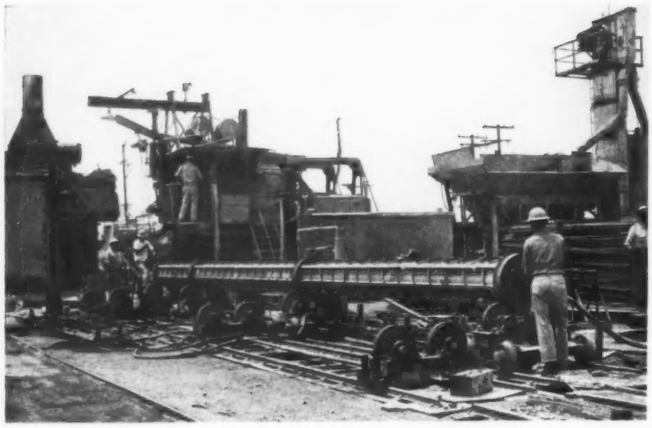
U. S. Steel builds new research laboratory

Construction is under way on the new electromechanical laboratory at the Monroeville, Pa., Research Center of the U. S. Steel Corp., Pittsburgh. The new facility will provide a 54,000-square-foot area for development work in instrumentation, process, and material-handling mechanisms, and automatic control in steel production.

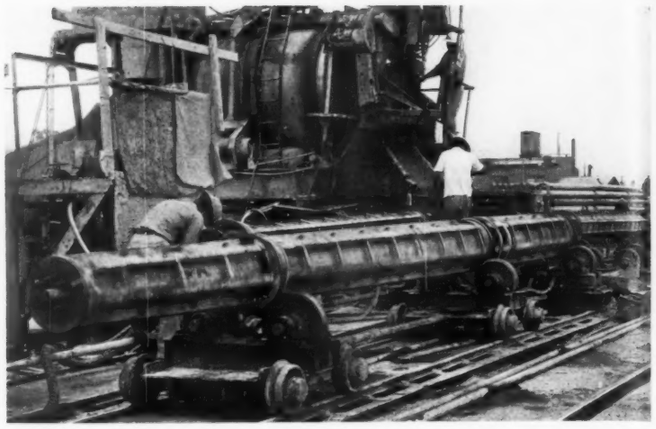
The new research facility will be of steel-frame construction, using porcelain enameled steel panels and brick combined with stainless steel trim for exterior walls.

The firm's subsidiary, U. S. Steel Export Co., has moved its general offices to 100 Church St., New York City. This firm acts as export distributor of U. S. Steel products.

A major addition to the strip steel processing equipment of the firm's Tennessee Coal and Iron Division, Fairfield, Ala., is expected to be completely installed within two years. The new facility will be a continuous annealing (heat treatment) line and marks the launching of an important modernization at the tin mill. Engineering for the 457-foot installation is presently in progress, with actual construction scheduled to begin following the planning phase.



Concrete placement starts on a Spunpile. The form contains heavy reinforcing, with longitudinal rods in tension. The Johnson plant, right, discharges to the Koehring 34-E, and the mix is introduced into the hole in the center of the end cap.



When concrete is in the form and the intake pipe is closed, hydraulic motors on the roller spin the pile at high speed. Eight longitudinal reinforcing bars projecting out through the end of the cap are held in tension by nuts.

Prestressed-concrete pilepro

Rigid form holds pretensioned reinforcing steel while concrete is placed by centrifugal process

Using a centrifugal process for placing the concrete and a rigid steel form to hold the pretensioned reinforcing steel, Macco Corp., Paramount, Calif., is producing strong prestressed-concrete piles in which the concrete is unusually dense. Among the many projects on which these Macco Spunpiles have been used recently is the first increment of the subsidence remedial program at the Long Beach Naval Shipyard. (See "Remedial Works Protect Subsiding Navy Shipyard", C&E, August, 1958, page 32).

Macco Spunpiles are 16 inches in diameter, except for 20 feet at the tip, which tapers to 10 inches. A 3-foot section at the tip is solid concrete, but the remainder of the pile has an 8-inch-diameter hole through the center. The piles are manufactured in lengths from 15 to 100 feet.

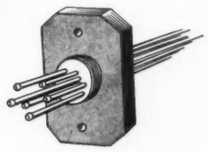
The unique feature in the manufacture of these piles is the heavily reinforced, rigid cylindrical form in which they are cast. The form is assembled in sections to make up the desired length of finished pile, and the reinforcing cage is inserted into the form.

The typical reinforcing consists of eight ⅝-inch longitudinal bars and a wrapping of No. 8 wire on a 3-inch pitch. A 1-foot section at each end is wound to a 1-inch pitch. The longitudinal bars extend out through heavy caps, which are placed over

The centrifugal force set up by the spinning whirls the mix to the edges of the form and forces excess water to the center. The result is a very dense mix. Excess water is being drained out of a hole in the end cap.

A 100-foot-long Spunpile is picked for stockpiling by a truck crane that uses a two-point pickup and a very short strongback. These piles measure 16 inches in diameter, except for 20 feet at the tip, where they taper to 10 inches.

pile produced by spinning



the ends of the cylindrical form.

Tension is then applied to the longitudinal rods by a jacking device, and they are locked in place with nuts which bear against the cap. A crane transfers the form to the casting bed.

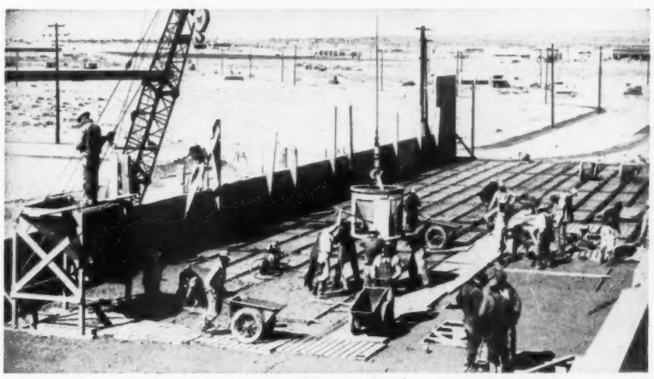
Concrete is proportioned in a Johnson batch plant with a rolling weigh hopper. This discharges directly into the skip of a Koehring 34-E paver. The mix is introduced into the form through a hole in the center of the end cap.

The form rests on a series of powered rollers driven by hydraulic motors. As the concrete is introduced into the form, these motors begin rotating the form, and their speed is increased until the concrete is spun into a hollow cylinder inside the form. The centrifugal placing method drives out the excess water and creates a very dense mix. This water, which collects in the center, is drained off when the spinning is completed.

After the concrete has attained sufficient strength, the jacking nuts on the steel are released and the form is removed. The concrete is cured with water or by a spraying with Hunt Process Clear curing compound.

Even in lengths up to 100 feet, the finished piles—weighing about 150 pounds per linear foot—can be handled by a crane using a two-point pickup. THE END

Concrete job pays extra profits for careful planning of concrete handling



Concrete construction on this 300′ x 600′ airplane hangar required two types of concrete handling—(1) bulk handling for columns, foundation and 17″ thick walls and (2) slower paced handling for thin finished floor slabs. The problem was—how to prevent delays and inefficiencies in one or both placement jobs.

The answer here was to divide the work and use two separate crews and two concrete handling methods simultaneously.

First, two Gar-Bro Buckets per crane were used for the bulk placing. While one bucket was being filled, the other was placing concrete. Thus with a minimum crew, a fast pace was maintained.

Second, Gar-Bro Floor Hoppers and a fleet of Concrete Carts supplied the slab work. The concrete buckets load the floor hoppers for cart charging and alternate for direct column pouring, thus holding the balance of the operation.

In this way there were no delays and no interruptions of work. A steady delivery of concrete by ready mix trucks provided maximum efficiency.

Headaches came boulder-size on this grading job

Broken rock is loaded to a Euclid end-dump by a Northwest shovel. Boulders like these were encountered all through the 6.4-mile section. The larger ones will be drilled and shot to reduce them to a size for handling.

Boulders—ranging from the size of a baseball to bigger than a house—were the most troublesome factor in the grading of a 6.4-mile section of U. S. 16 on a completely new alignment through Ten Sleep Canyon in north central Wyoming.

This $695,000 Bureau of Public Roads contract with Eagle Construction Co., Inc., Boise, Idaho, covered the final phase in the job of cutting a new road through the most rugged part of Ten Sleep Canyon in the Bighorn National Forest.

The boulders had fallen from the canyon walls or been washed down over the centuries during which the canyon was being carved out by Ten Sleep Creek, which is a far cry from the lazy brook its name might indicate. Some boulders lay completely on the surface; some were buried. Still others were partly exposed.

When a scraper or dozer started working on one of the partly exposed stones, there was no telling how large it might turn out to be. Some were small enough to be easily loaded by the International TD-24 tractors pulling 16-yard Wooldridge and LeTourneau-Westinghouse scrapers. Others somewhat larger could be pushed and rolled out of the way by one of the four TD-24 tractor-dozers in the spread.

Other boulders, which just peeked out of the soil, turned out to be as big as houses when they were uncovered. These had to be drilled and shot to break them down into pieces which could be handled. In still other cases, what looked like just another boulder would turn out to be a solid rock outcropping. These latter situations were turned over to a crew equipped for rock excavation.

Rough on tractors

The big tractors literally clawed their way over the rocky ground. Working on steep grades in the maze of hidden boulders, and on a foundation consisting of a little dirt mixed with many rocks, it seemed that the tracks would be literally torn off the machines each time a blade hit a concealed rock. Actually, track wear was the biggest maintenance problem. The contractor found that by the time the grousers were worn down enough to need replacing or building up, the tracks were usually in such bad shape that it was most economical to replace the complete tracks.

An International TD-24 tractor push-loads a LeTourneau-Westinghouse scraper being pulled by another TD-24. The pusher has a Bucyrus-Erie dozer blade and an Ateco ripper.

A Euclid end-dump deposits material for a fill over a culvert. An Ingersoll-Rand 315-cfm Gyro-Flo compressor (right) supplies air for an I-R pneumatic tamper being used to compact the fill.

Winding up the south wall of the canyon, the old highway has several switchbacks with very sharp curves, and its variable grade is quite steep in some sections. Rather than try to rework this alignment and fight traffic throughout the reconstruction, the BPR engineers chose a bold new alignment following the opposite side of the canyon.

This new alignment follows the canyon wall much of the way. Near the center of the section there is one big switchback on which the grade is flattened to 4 per cent. The rest of the way, the grade is a straight 6 per cent. From Ten Sleep, Wyo., at the west end of tne canyon, this highway climbs more than 4,000 feet to cross the Big Horn Mountains through Powder River Pass, whose summit is 9,666 feet above sea level. Nearly 1,900 feet of the climb lies within the 6.4 miles of Eagle's grading contract.

The roadway section is graded to a 30-foot-wide top with 1½ to 1 slopes where conditions permit. The grading contract included the production and placing of 28,000 tons of minus 2-inch crushed-rock subbase material put down in a single 4-inch course. A 4-inch-thick base course and 2-inch bituminous pavement were to be constructed under a future contract.

Other items in the grading contract were the excavation of 727,000 cubic yards of unclassified excavation and the placing of 4,126 linear feet of corrugated-metal-pipe culvert in sizes ranging from 24 to 54 inches in diameter. Near the upper end of the job, the road crosses the canyon on a bridge being built under a separate contract.

Scrapers handle dirt

Starting the project in February, 1957, Nick Shaver, superintendent for Eagle Construction Co., sent his powerful TD-24 tractor-dozers ahead to pioneer an access road. Up to this time, practically every foot of the 6-mile job was inaccessible to any equipment. These tractors were equipped with Bucyrus-Erie dozers, and two of them carried rear-mounted Ateco rippers.

The dozers first pioneered a road wherever they could get through; then, they came back to start the top of each cut and the bottom of each fill. Because of the many boulders which could be expected to roll

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down the fills, it was also necessary to build a catch road along the toe of each fill.

Then the tractors came back, picked up three scrapers, and began the tedious task of hacking out the cuts and building the fills. Two of the scrapers were LeTourneau-Westinghouse rigs while the third was a Wooldridge. Pushed by TD-24 tractors, the scrapers picked up what dirt and rocks they could get and carried them to the fills. The other tractors with their dozers and rippers chewed away at the rocks which the scrapers couldn't move.

When one of the very large boulders was uncovered, a drilling crew moved in with Ingersoll-Rand jackhammers powered by an I-R 125-cfm Gyro-Flo compressor. The holes were loaded with Olin 40 per cent special dynamite to shatter the boulders into pieces small enough to be handled.

Compacting this rough material in the fills was almost as tough a job as getting it there. Two International TD-14 tractors and a Caterpillar D6 with sheepsfoot rollers worked the fills continuously. With the heavy tractors and scrapers, this provided adequate compaction.

Since it was impossible for a water truck to operate on the fills, the water required for compaction was applied with hand-held hoses. A Rex 4-inch pump drafted from deep holes in the creek and pumped the water through a line of 4-inch aluminum irrigation pipe to the fill locations. Here a workman with a hose and nozzle played a stream of water over the fill material as it was dumped and spread.

Rock excavation

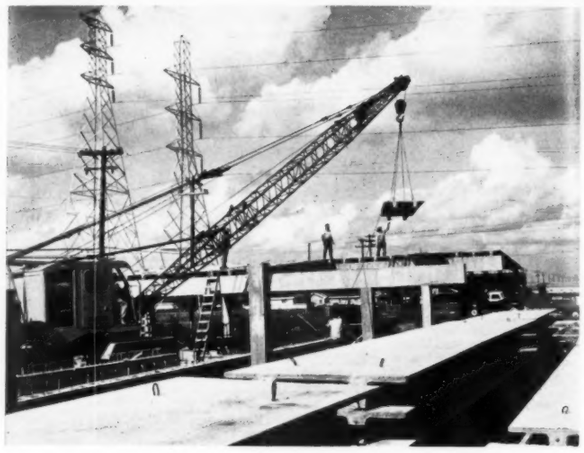
Solid rock was drilled and blasted and loaded by a Northwest shovel. The drilling crew used an Ingersoll-Rand wagon drill powered by an I-R 315-cfm Gyro-Flo compressor, and the holes were loaded with Olin 40 per cent special dynamite. The shot rock was hauled to the fills in two Euclid end-dumps.

Placing the 4,100 linear feet of corrugated-metal-pipe culverts and compacting the fill around them was another hard job. First of all, it was difficult to dig the trenches through the boulder-laden ground. Then it was a slow hand operation to sort out enough rock-free dirt to bed the pipes and backfill around them. The backfill was tamped with an Ingersoll-Rand pneumatic tamper powered by an I-R compressor.

Personnel

Representing the Bureau of Public Roads on the project were Fred Soltero, project engineer; Roland Lacy, assistant project engineer; and Philip Dowlin, inspector. Eagle's supervisory staff, in addition to Shaver, included James Humphries, tractor foreman, and Ivan Treet, shovel foreman. THE END

The Montana Highway Commission awarded a total of $8,135,110.41 in road contracts in July, an all-time monthly high for the state.



A POST-TENSIONED double-tee deck span is being lowered into place by an American Model 375 truck crane for a Houston, Texas, community shopping center. Pozzolith admixture was used instead of steam curing for the spans and beams. The lightweight aggregate in the spans had a 10-day minimum strength of 3,500 psi. The 5-foot-wide 30-foot-long deck spans and the 50-foot-long beams, cast at the job site by Stresdek Bldgs., Inc., were post-tensioned by the Prescon System.

Manufacturer memos

Walter E. Schirmer, president, and Martin E. Graham, vice president and general manager, Clark Equipment International, C. A.

Walter E. Schirmer and **Martin E. Graham** have been elected president, and vice president and general manager, respectively, of **Clark Equipment International, C. A.**, a wholly owned subsidiary of Clark Equipment Co., Buchanan, Mich. Schirmer, a Clark executive for 21 years, has headed the firm's legal department, has been sales manager of the Industrial Truck Division and, since 1947, has been a vice president of the parent firm.

Graham formerly managed the Industrial Truck Division of Clark International.

The Construction Machinery Division of **Clark Equipment Co.** has appointed **Dan B. Daily** a district representative for Wisconsin, the Upper Peninsula of Michigan, Minnesota, North Dakota, and Manitoba and western Ontario, Canada. He will headquarter in Lakeville, Minn.

Philip E. Cunningham has been appointed new product manager for the excavator line produced by the **Koehring Division,** Koehring Co., Milwaukee, Wis. Before his appointment he was with a construction-machinery distributor in Wisconsin.

Philip E. Cunningham, new product manager for the excavator line of Koehring Division.

The firm also named **Edward R. Gee** district representative for the northeastern part of the country. He, too, was formerly with a construction-machinery distributor.

Russell E. Story, manager of Bucyrus-Erie Co. of Canada, Ltd.

Russell E. Story has been named manager of **Bucyrus-Erie Co. of Canada, Ltd.**, Guelph, Ontario, a subsidiary of Bucyrus-Erie Co., South Milwaukee, Wis. Story was manager of B-E's Chicago works from September, 1956, until its closing earlier this year. Since then he has been assistant to the manufacturing manager at the home office.

The new sales promotion manager for the company is **Charles Parthum.** He was formerly director of public relations, sales promotion, and advertising for Harnischfeger Corp., Milwaukee.

John Mullenmaster, vice president and director of sales for the Owatonna Tool Co.

The **Owatonna Tool Co.**, Owatonna, Minn., has elected **John Mullenmaster** vice president and director of sales. He was formerly industrial sales manager.

The firm has created two new territorial sales divisions. The eastern sales division is headed by Robert Allyn, who was sales manager in charge of distributor sales. William Murray, former assistant sales manager, heads the western sales division.

The **Florida Division,** Food Machinery & Chemical Corp., Lakeland, Fla., has appointed **Anthony J. Abruzzo** Form-Crete sales engineer for the northeastern territory. From headquarters in Bethpage, Long Island, N. Y., Abruzzo will cover New York, the New England states, and eastern Ontario and Quebec Province, Canada.

Anthony J. Abruzzo, sales engineer for the Florida Division, Food Machinery & Chemical Corp.

Gordon P. Smith has been elected director of traffic for **The Colorado Fuel & Iron Corp.**, New York City, and will be headquartered at the firm's plant in Claymont, Del.

Gordon P. Smith, director of traffic for The Colorado Fuel & Iron Corp.

Smith was formerly general traffic manager of the company's Eastern Division.

Mechanized paving spread spurs interstate project

Contractor puts down concrete slab at good pace with fast-moving, smooth-running equipment fleet

Leading the paving train is this Blaw-Knox Multifoot 34-E paver, here lifting its skip to charge the mixer. A workman wets the subgrade ahead of the concrete placing.

An average of 2,200 linear feet of 12-foot-wide concrete slab per 9-hour day, using only one paver, was the pace maintained on the outside lanes of a 6½-mile project last season by an Ohio contractor.

A completely mechanized, smooth-running spread enabled Fischer Construction Co., Cincinnati, to hit this healthy stride on a $3,104,000 contract, part of the relocation of U. S. 40 between Englewood and Vandalia, Ohio. U. S. 40 is undergoing a face lifting throughout Ohio, and many sections are being relocated to bring this important east-west artery up to interstate standards.

Form-trench cut

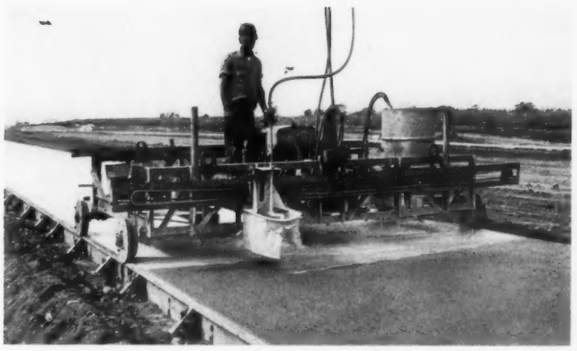
Beginning with the preparation of the form trench, the contractor used a Cleveland Formgrader to cut and compact the 12-inch-wide 1-inch-deep trench in the subgrade. This left the subgrade 1 inch higher than the base of the forms to permit the subgrader to level it off between the set forms. Fischer had about 12,000 linear feet of Blaw-Knox 9-inch steel forms on the job. The forms were placed and moved by a Quick-Way truck crane.

After positioning of the form sections in the prepared trench, a Le Roi Tractair self-propelled air compressor was used to power a Thor air hammer for driving the form stakes. The contractor always kept about 2,900 linear feet of forms set ahead of the paver during the paving of the outside 12-foot roadway lanes, which were completed first. Then, by doubling the paving spread and using the same single form crew, he could set over 4,500 linear feet of single line forms to complete the inside 12-foot lanes.

Fischer found paving of just the inside lanes with the two pavers more economical because it did not require a double form-setting crew. If two pavers had been used for the outside lanes, requiring a double line of forms, two crews would have been required to maintain the distance ahead of the pavers.

A Blaw-Knox subgrader, riding on the forms, prepared the final subgrade between the forms. This rig, which pulled itself along by means of two cables attached to the form stakes, also pulled a planer which smoothed the subgrade. The subgrade was then compacted by a Buffalo-

Working behind a Blaw-Knox spreader are this Jaeger double-screed transverse finisher and a Koehring longitudinal floating machine. Hand crews will touch up the slab surface behind these rigs.



Bringing up the rear of the paving train, this Heltzel Flex-Plane machine sprays Hunt's white-pigmented curing compound over the slab surface. Forms will be stripped the following day.

Springfield 5-ton tandem roller equipped with a scratch board to check the crown and cross section of the subgrade.

Transverse joints, formed by a ⅛-inch-thick metal divider supported in a Bethlehem Steel basket, were positioned by the form crew on 60-foot centers. The steel basket also supported twelve 1-inch-diameter steel dowels, 18 inches long, spaced on 12-inch centers between the forms. Removable metal caps were placed over the joint dividers to permit continuous paving over the joints. A Kohler generator, mounted in a truck trailer, powered the electric wrenches used to secure the hook bolts to the side forms.

Paving train

Leading off the paving train was a Blaw-Knox Multifoot 34-E paver, riding along the outside of the forms and placing concrete batches in front of a Blaw-Knox spreader. The paver was supplied with water by a 2,500-gallon tanker. This tanker, pulled by the paver, was kept full by a 4,000-gallon tanker which hauled water from a nearby creek. Here an overhead tank was pumped full from the creek, allowing the trucks to be charged by gravity flow.

The spreader, equipped with two rear-mounted Jackson vibrators which were pulled through the concrete near the forms, made an initial pass to trim the mix to a 6½-inch depth, after which workmen placed the welded-wire reinforcing at the correct slab depth.

The paver and spreader then backed up over the wire mesh to place additional concrete batches over the reinforcing, thus completing the 9-inch slab thickness.

Following the spreader was a Jaeger double-screed transverse finisher and a Koehring longitudinal floating machine. The metal cap covering the transverse joint fillers, was then removed to permit the hand-finishing crew to dress the joint. This crew used wood and aluminum straightedges to complete the slab surface. Bringing up the rear was a Heltzel Flex-Plane machine spraying Hunt's white-pigmented curing compound across the slab as it rode the forms.

Forms were stripped the following day by removing the form stakes with an Urschel air-operated pin puller

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A Cleveland Formgrader cuts the 12-inch-wide 1-inch-deep trench for the form sections. The string line positioned along the inside 12-foot lane serves as a guide for the operator.

and picking up the sections with the Quick-Way crane. They were loaded on a truck and moved ahead of the paving spread to be repositioned.

Paving inside lane

Fischer used an additional Multi-foot single-drum paver to place the concrete for the inside lane, thus increasing daily footage poured without increasing the form-setting crew. The second paving spread included a Jaeger spreader, a Heltzel transverse finisher, and a Koehring longitudinal floating machine. This doubling of the paving spread resulted in an average daily production of about 4,500 linear feet.

Batch plant

Supplying the concrete mix to the pavers was an Erie Strayer batch plant located about midway on the job. It consisted of an Erie three-compartment, 100-ton aggregate bin, equipped with a Howe scale and manual controls; two 700-barrel cement silos, and one 450-barrel cement bin.

The aggregate bin was charged, from three stockpiles, by a Lima 802 crane equipped with a 2-yard re-handling bucket. The stockpiles of No. 3 and No. 4 stone, and sand, were

This Erie Strayer cement batching setup includes a 450-barrel bin and two 700-barrel silos, charged by a 75-foot-high enclosed bucket elevator. The Worthington air compressor at right supplies air to the plant.

wetted down at a rate of 4,000 gallons per pile during the evening after the plant was shut down. This was done during the summer months to maintain the correct moisture content in the aggregates.

Sand and stone were delivered to the plant site by truck, as was the cement. Cement was charged into the silos and bin through a hopper, screw conveyor, and a 75-foot enclosed bucket elevator.

Electric power was supplied to the plant by a Westinghouse generator driven by a Buda diesel engine. A Worthington air compressor, located on the ground, supplied air to the cement-bin batch gates.

Personnel

Howard Fischer was project manager and George Hines, superintendent, for Fischer Construction. They kept in constant touch with all phases of the job by means of General Electric mobile radios and base station. Fred E. McCormick was project engineer for the Ohio Department of Highways. THE END

Public works chief named

Charles V. Smith has been appointed commissioner of public works for Nassau County, N. Y., to succeed the retired John C. Guibert. Smith, a licensed professional engineer and land surveyor in New York State, was formerly senior deputy commissioner.

Convention calendar

September 15–20 International Congress on Large Dams
Sixth Congress, Statler-Hilton Hotel, New York City. U. S. Committee on Large Dams, International Commission on Large Dams, 29 W. 39th St., New York 18, N. Y.

September 17–18 Building Research Institute
Conference, Sheraton-Park Hotel, Washington, D. C. Harold Horowitz, technical secretary, BRI, National Academy of Sciences, 2101 Constitution Ave., Washington 25, D. C.

September 17–19 Producers' Council
Thirty-seventh Annual Convention, Dupont Plaza Hotel, Miami, Fla. PC, 2029 K St. N. W., Washington 6, D. C.

September 20–26 American Society of Sanitary Engineering
Annual Meeting, Claridge Hotel, Atlantic City, N. J. James V. Crosta, chairman, ASSE, 68 Fairmount Terrace, East Orange, N. J.

September 21–25 Prestressed Concrete Institute
Fourth Annual Meeting and Convention, Edgewater Beach Hotel, Chicago, Ill. PCI, General Arrangement Committee, Box 391, La Grange, Ill.

September 22–24 Associated General Contractors of America
Mid-Year Board Meeting, Atlantic Biltmore Hotel, Atlanta, Ga. James D. Marshall, executive director, AGC, 20th and E Streets N. W., Washington, D. C.

September 22–24 The Material Handling Institute, Inc.
Fall Meeting, The Greenbrier, White Sulphur Springs, W. Va. Meeting also held with the Industrial Truck Association, Monorail Manufacturers Association, and Association of Lift Truck and Portable Elevator Manufacturers. L. West Shea, managing director, MHI, One Gateway Center, Pittsburgh 22, Pa.

September 28–October 1 American Public Works Association
1958 Public Works Congress and Equipment Show, Municipal Auditorium and Hotel Muehlebach, Kansas City, Mo. D. F. Herrick, executive director, APWA, 1313 E. 60th St., Chicago 37, Ill.

September 29–October 2 New York State County Highway Superintendents Association
Joint Meeting with County and Local Roads Division of American Road Builders' Association, Concord Hotel, Lake Kiamesha, N. Y. H. R. Mason, secretary, NYSCHSA, Fonda, N. Y.

September 30–October 2 Southeastern Association of State Highway Officials
Meeting, Tutwiler Hotel, Birmingham, Ala. A. Reese Harvey, secretary, SASHO, Alabama State Highway Department, Montgomery, Ala.

October 5–8 National Association of Corrosion Engineers
Symposium, Boston, Mass. M. M. Jacobson, NACE, Watertown Arsenal Laboratories, Watertown 72, Mass.

October 7–10 Short Course on Roadside Development
Seventeenth Annual Short Course, Columbus, Ohio. Wilbur J. Gramhausen, chief landscape architect, SCRD, Ohio Department of Highways, Columbus 15, Ohio.

October 13–18 American Society of Civil Engineers
Annual Convention, Statler-Hilton Hotel, New York City. Don P. Reynolds, assistant to the secretary, ASCE, 33 W. 39th St., New York, N. Y.

October 15–18 American Bridge, Tunnel and Turnpike Association
Annual Meeting, Hotel John Marshall, Richmond, Va. J. Allyn Stearns, executive secretary, ABTTA, P. O. Box 148, White Plains, N. Y.

October 20–21 National Association of Corrosion Engineers
Annual Conference and Exhibition of South Central Region, Roosevelt Hotel, New Orleans, La. T. J. Hull, executive secretary, NACE, 1061 M & M Bldg., Houston 2, Texas.

October 20–24 Natl. Safety Council
Forty-sixth Safety Congress and Exposition, Conrad Hilton Hotel, Chicago, Ill. R. L. Forney, secretary, NSC, 425 N. Michigan Ave., Chicago 11, Ill.

October 21–22 Natl. Slag Association
Forty-first Annual Meeting, Mayflower Hotel, Washington, D. C. NSA, 613 Perpetual Bldg., Washington 4, D. C.

October 23–24 Virginia Highway Conference
Conference, Virginia Military Institute, Jackson Hall, Lexington, Va. R. P. Ellison, executive assistant, VHC, 1221 E. Broad St., Richmond 19, Va.

October 23–25 National Society of Professional Engineers
Fall Meeting, St. Francis Hotel, San Francisco, Calif. J. A. Sontheimer, secretary, California Society of Professional Engineers, c/o St. Francis Hotel, San Francisco, Calif.

October 26–30 American Institute of Steel Construction
Annual Convention, Greenbrier Hotel, White Sulphur Springs, W. Va. L. Abbett Post, executive vice president, AISC, 101 Park Ave., New York, N. Y.

October 26–31 International Road Federation
Third World Meeting, Seop Bldg., Mexico City, Mexico. Robert O. Swain, executive director, IRF, 1023 Washington Bldg., Washington 5, D. C.

October 27–29 National Lubricating Grease Institute
Annual Meeting, Edgewater Beach Hotel, Chicago, Ill. T. W. H. Miller, executive secretary, NLGI, 4638 Nichols Parkway, Kansas City, Mo.

November 20–21 Electronic Computation Conference
Conference, sponsored by Kansas City Section of the American Society of Civil Engineers and the Structural Division of ASCE, Continental Hotel, Kansas City, Mo. Steven J. Fenves, secretary, ECC, Civil Engineering Hall, University of Illinois, Urbana, Ill.

Air photos, soil mapping appraised in HRB bulletin

Two papers on "Air Photo and Soil Mapping Methods: Appraisal and Application" are developed in the Highway Research Board's Bulletin 180. Also included is a listing of the current activities of the U. S. Geologic Survey in mapping, throughout the United States and its territories.

The first paper summarizes data covering 10 years of mapping granular construction materials from aerial photographs. The use of soils maps in the operation and planning of the highway facilities of Ingham County, Michigan, are described in the second.

Priced at 80 cents, the bulletin is available from the HRB, 2101 Constitution Ave., Washington 25, D. C.

Handy for stacking concrete blocks is the fork-lift attachment now available for all Michigan tractor shovels. Designed for rapid installation on the job, the attachment requires no altering of hydraulic connections. Capacities vary from 4,000 pounds at 24 inches from the heel of the fork on the Model 75A 1¼-yard tractor shovel, to 15,000 pounds on the 6-yard Model 375A. For further information write to the Construction Machinery Division, **Clark Equipment Co.**, Dept. C&E, Pipestone Road, Benton Harbor, Mich., or use the Request Card at page 18. Circle No. 71.

Ohio issues 1958-1959 official highway map

The Ohio Department of Highways has issued its 1958–1959 official highway map showing all significant changes made to existing highways since the 1957 map was produced, as well as the major new highways which are now under, or scheduled to be placed under, construction this year.

All incorporated municipalities are shaded in yellow, and there are larger and more detailed insets of Ohio's three largest cities—Columbus, Cincinnati, and Cleveland. Other features include an explanation of new "Yield Right of Way" signs, a map of the eastern half of the United States (with all major routes indicated), illustrations of edge-lined highways, an index to points of interest, and a diagram of the Interstate Freeway network in Ohio.

Copies of the map may be obtained from the Ohio Department of Highways, Room 1010, Ohio Departments Bldg., Columbus, Ohio.

Research and patent consulting service opens

Dr. George E. Ziegler, a research consultant for Zonolite Co., Chicago, Ill., has opened a physics, patent, and research consulting service at 3020 Grant St., Evanston, Ill. Consultation in the fields of general and advanced physics, electro-mechanics, optics, electronics, and the construction industries will be provided.

Consulting services will include court service as a patent expert witness, preparation of advanced physics patent applications, and application of physics technology in sales presentations. Other services include evaluation of company patent and research positions as an investment analysis tool, and consultation on research management.

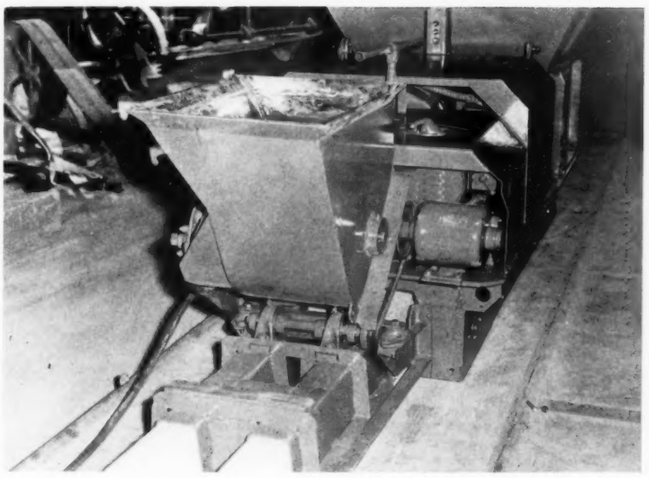
Pennsylvania pike news

The Pennsylvania Turnpike Commission has approved the appointment of its safety director, Harold S. Roberts, to the Safety Committee of the American Bridge, Tunnel and Turnpike Association. Roberts will serve on the committee, which will coordinate the safety activities of its members.

PRODUCT PARADE

For further information on any of the products described in the following section, circle the designated number on the Request Card at page 18.

Concrete extrusion machine runs on prestressing bed



The Prestressed Equipment Co. announces an extrusion, slip-forming machine for the production of prestressed concrete. Available in two models, the unit produces a variety of shapes including keystone joists, tee joists, I-joists, double tees, channels, and flat slabs.

The unit reportedly will produce two rows of 8-inch keystone joist continuously at the rate of 3 fpm. It runs on a flat conventional-type prestressing bed 15 to 20 feet wide and 400 to 600 feet long. The machine is electrically operated, and obtains all its traction from the flat bed without the need of any lugs or special grippers cast into the bed.

For further information write to the Prestressed Equipment Co., Dept. C&E, P. O. Box 1264, Lakeland, Fla., or use the Request Card at page 18. Circle No. 84.

Mobile hydraulic lift is boon to prestressing plants

A new mobile hydraulic lifting unit, said to be particularly useful in the handling of prestressed girders and other prestressed-concrete members, is announced by Travelift & Engineering, Inc.

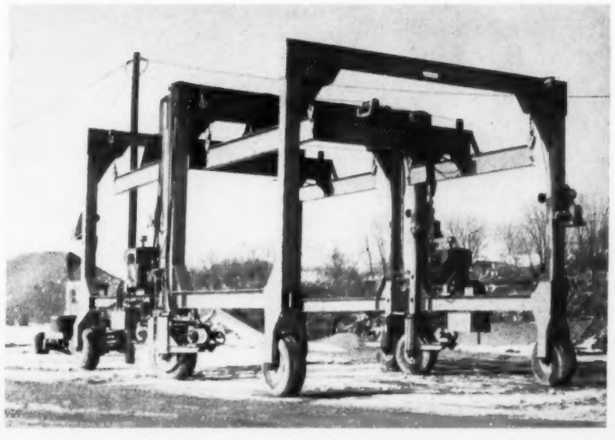
On this Travelift, lifting, propulsion, and steering are accomplished hydraulically, and all movements are controlled from the operator's platform by one man.

According to the manufacturer, the machine finds valuable application in clearing the beds, transporting the girders to the storage area, and in the subsequent loading of the girders on trucks. In the girder-handling operation, two units are used in tandem, and the hydraulic drive system so cushions the movement as to eliminate any sway of the girders during the transporting. Hydraulically operated trolleys provide for lateral movement of the load.

The unit can also be used to pull strand, set caging, handle and set forms, pour forms, and to do many other jobs where heavy lifting and moving problems are involved. It can be employed to strip forms in lengths to 60 feet, from both sides of the bed, and reset them on other beds in a single operation.

Offered in standard capacities of 7, 12, and 25 tons, this Travelift can also be modified to provide for increased length, width, and height where such changes are required to handle larger components.

For further information write to Travelift & Engineering, Inc., Dept. C&E, Sturgeon Bay, Wis., or use the Request Card at page 18. Circle No. 132.



The necessity of measuring and marking each piece of steel to be bent is eliminated by a measuring scale attached to the bending arm.

New, unique tool shapes reinforcing steel on job

A manually operated tool for on-the-job bending of reinforcing steel is available from the Clyde Mfg. Co., Inc.

According to the manufacturer, the tool will bend ¼, ⅜, ½, ⅝, and ¾-inch steel to practically any shape. The 12-pound unit can be set up for operation in a matter of minutes, and is easily carried in the back of a pickup truck.

The company claims that a single unskilled workman can produce complex shapes as fast as two or three men can tie them in place.

For further information write to the Clyde Mfg. Co., Dept. C&E, Bridgeway and Turney, Sausalito, Calif., or use the Request Card at page 18. Circle No. 12.

New rock drill bit reduces drag, binding

For rock formations where better clearance is needed and extraction of the bit is difficult, Brunner & Lay offers its cutaway-type carbide Rok-Bit.

The bit has self-clearing chip channels and fast cutaway wings, designed

to minimize drag and binding. It is available in gage sizes from 1½ through 4 inches.

For further information write to Brunner & Lay, Inc., Dept. C&E, 9300 King St., Franklin Park, Ill., or use the Request Card at page 18. Circle No. 52.

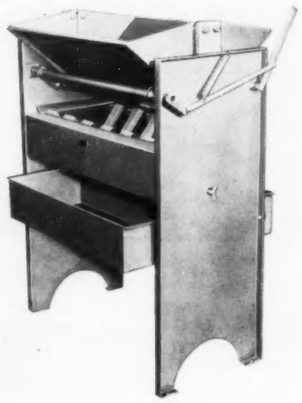
Improved sample splitter handles all aggregates

An improved sample splitter for the reduction of aggregate samples, from sand through coarse sizes, is announced by the Gilson Screen Co.

In using the new unit, the sample to be reduced is placed in a lever-actuated clamshell hopper where it may be leveled or evenly distributed by hand. The lever opening of the hopper releases the sample precisely on the center line of the splitter chutes below. Each half of the resulting split retains the character and gradation of the original total sample.

The unit measures 39 inches high to the top of the hopper, is 29 inches long over all, and 19 inches wide.

For further information write to the Gilson Screen Co., Dept. C&E, 110 Center St., Malinta, Ohio, or use the Request Card that is bound in at page 18. Circle No. 70.



This trap loader is loading vehicles at the rate of 3,600 yards per hour for contractor S. W. Groesbeck of Eugene, Ore., on the Columbia River Highway project near Corbett, Ore. An Albina-built unit, the 14'× 14-foot steel hopper is fed by bulldozers, and the material is transferred into the trucks by a 60-inch inclined belt. Power is supplied by a Cummins Model HR-6-1P 150-hp diesel engine. For further information write to the **Albina Engine & Machine Works, Inc.**, Dept. C&E, 2100 N. Albina Ave., Portland, Ore., or use the Request Card at page 18. Circle No. 90.

Two new pumps rated at 266 and 333 gpm

The Worthington Corp. announces the addition of two new models of contractors' pumps to its 1958 line.

The Models 15M and 20M are rated at 266 and 333 gpm maximum capacity, respectively. Both incorporate a replaceable cast-iron recirculation

port that eliminates valves and permits renewal of internal clearance. These self-priming centrifugal pumps are engine-driven, but are also available as motor-driven units.

Other features of the new models include a constant-pressure automatic grease lubricator; hydraulically balanced open impeller; and replaceable cast-iron wear plate.

For further information write to the Worthington Corp., Dept. C&E, Worthington and Harrison Aves., Harrison, N. J., or use the Request Card that is bound in at page 18. Circle No. 65.

Tractor-mounted digger is easily detachable

A fast-digging, easily detachable tractor-mounted power digger called the Panther is announced by Sherman Products, Inc.

The machine is powered by a compact 25-hp hydraulic system that operates at 2,000 psi. It has an available digging force of 19,250 pounds.

A special transmission to step up power-takeoff shaft speed is a feature.

For further information write to Sherman Products, Inc., Dept. C&E, 3200 W. 14 Mile Road, Royal Oak, Mich., or use the Request Card that is bound in at page 18 of this issue. Circle No. 24.

The new pulverizer attachment for Barber-Greene's Model 82-A (crawler-mounted, long-boom) or Model 582 (crawler-mounted, short-boom) bucket loaders permits topsoil stripping, loading, and pulverizing in a single, one-machine operation. Recommended for road contractors doing clay stabilization base work, the pulverizer is driven by a separate, small gasoline engine, and employs a heavy shaft on which a series of free-swinging short chains is mounted. The topsoil is excavated by the loader's spirals, and elevated by a continuous chain of buckets. Discharged from the buckets, the material falls through this rapidly rotating flail arrangement, and is thoroughly pulverized and aerated before finally being discharged into trucks. For further information about this pulverized attachment, write to the **Barber-Greene Co.**, Dept. C&E, 400 N. Highland Ave., Aurora, Ill., or use the Request Card at page 18. Circle No. 6.

New portable generator has 2.5-kw capacity

A direct-coupled beltless portable electric generator with a capacity of 2.5 kw, supplying 115 volts of direct current, is offered by the Construction Equipment Division of the Thor Power Tool Co.

The Model EG-2.5D weighs 165 pounds (dry) and is 31¼ inches long,

20 inches wide, and 19½ inches high.

The aluminum control box has two 15-amp 3-prong receptacles of the straight bayonet-grounding type, which also will accept 2-prong plugs. The control box is available with alternate 3-prong, 20-amp, 125-volt grounded Twist-Lok receptacles.

The Model EG-2.5D's gasoline engine is a four-cycle, single-cylinder unit with a nominal engine speed of 3,600 rpm.

For further information write to the Thor Power Tool Co., Dept. C&E, 175 N. State St., Aurora, Ill., or use the Request Card at page 18. Circle No. 38.

Seamless cone offered for concrete slump tests

Slump tests on concrete can now be performed more efficiently with a new seamless slump cone, according to the manufacturer, Soiltest, Inc.

The cone is made of heavy-gage cadmium-plated sheet steel, and is of one-piece construction. The handles and foot clamps are welded in position and are also cadmium-plated to resist rust.

The unit is made in the form of a portion of a cone with an 8-inch-diameter open base and a 4-inch-diameter open top. Height is 12 feet.

For further information write to Soiltest, Inc., Dept. C&E, 4711 W. North Ave., Chicago 39, Ill., or use the Request Card at page 18. Circle No. 129.

Featuring a digging speed of up to 800 feet per hour, this Auburn Gear-Draulic trencher is designed for use with the Massey-Ferguson Model 202 Work Bull tractor. The rig compensates automatically for varying ground conditions, and handles trenches up to 6 feet deep in 6, 8, 10, 12, and 14-inch widths. The digging boom is operated hydraulically and has a vertical operating arc in excess of 190 degrees. For further information write to the **Massey-Ferguson Industrial Division,** Dept. C&E, 1009 S. West St., Wichita, Kans., or use the Request Card at page 18. Circle No. 48.

Single-unit pipe coupler for pressure-joint pipe

The E. H. Wachs Co. offers a new single-unit pipe-coupling machine for cement-asbestos, concrete, clay, or cast-iron pressure-joint pipe.

The Wachs pipe coupler sits on top of the pipe, and is clamped in position with a single-action lever.

According to the company, this compound leverage coupler pulls the pipe all the way home for a tight, positive seal. The unit sits on top of the pipe, and is clamped in position with a single-action lever. No chains, cables, or pulleys are required.

The units are furnished in six sizes, from 6 to 16 inches.

For further information write E. H. Wachs Co., Dept. C&E, Chicago 22, Ill., or use the Request Card at page 18. Circle No. 11.

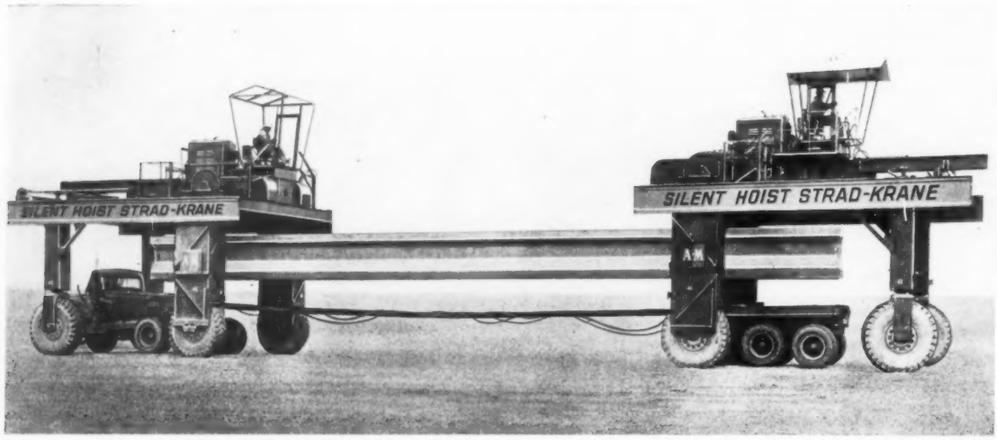
Quick erection a feature of automatic batch plant

The Automaster-A, an automatic aggregate batch plant with a capacity of up to 229 batches per hour, is offered by the C. S. Johnson Co.

According to the manufacturer, though the number of sections is kept to a minimum to permit quick erection and disassembly, the maximum erection lift is only 9 tons. Batching and recording equipment remain intact during moves.

Bins are available in 3 and 4-compartment styles, both with 120-cubic-yard heaped capacity.

For further information write to the C. S. Johnson Co., Dept. C&E, P. O. Box 71, Champaign, Ill., or use the Request Card at page 18. Circle No. 17.



On the Strad-Krane, the center of the load is always inside the wheel supports. This eliminates counterweights, stabilizers or jacks, thus increasing the rig's mobility.

Crane proves handy in prestress work

A material-handling crane designed as a traveling bridge and mobile crane in one unit is available from the Silent Hoist & Crane Co.

Designated Strad-Krane, the unit is self-propelled on pneumatic tires, and is said to be of especial value in handling large and weighty prestressed-concrete members.

According to the manufacturer, its prime feature is that the center of the load is always inside the wheel supports. This eliminates the need for counterweights, stabilizers, or jacks, thereby increasing the machine's mobility and function.

The load to be carried is suspended from a hook under the frame of the unit. This hook can be spotted directly over the load, and is controlled by a trolley bridge hoist located on the top structure. The hook can travel transversely from one end of the machine to the other and also up and down.

The machine shown in the photo

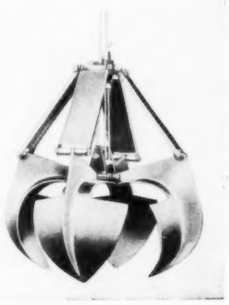
handles many jobs for the American-Marietta Co. It lifts the 100-foot 50-ton prestressed-concrete beams out of the forms and transports them to the yard area for curing. After curing, it lifts and loads the beams onto special over-the-road trailers.

In addition, the company reports, the Strad-Krane lifts and transports loaded concrete hoppers, delivers them over the forms, pours concrete into the forms, fills over 600 feet of I-beam forms every working day, and even strips the forms from the concrete. It also does all the chores of a fork-lift truck and a mobile crane in unloading steel, cable, and other material from motor trucks, and loading and unloading railroad freight cars.

For further information write to the Silent Hoist & Crane Co., Dept. 159, Dept. C&E, 841 63rd St., Brooklyn 20, N. Y., or use the Request Card at page 18. Circle No. 131.

Announce new series of heavy-duty buckets

The Erie Strayer Co. announces a new series of grab, grapple, and orange peel buckets for handling rock,



riprap, boulders, and other hard-to-handle materials.

According to the company, features of the grapple include heavy welded construction; oversize pins and bushings; recessed Alemite grease fittings; up to four parts of line reeving; large cast-steel sheaves; and positive socket-and-wedge cable attachment.

For further information write to the Erie Strayer Co., Dept. NR-68, Dept. C&E, Rudolph Ave. and NKP RR, Erie, Pa., or use the Request Card that is bound in at page 18. Circle No. 25.

Hydraulic form pin puller prevents damage to forms

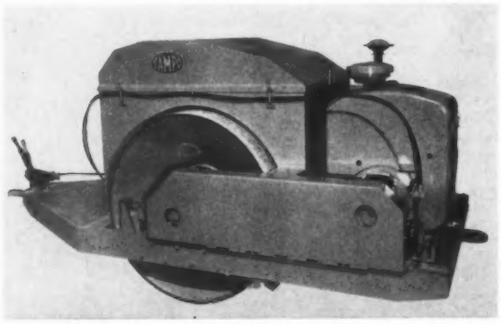
A new hydraulic form pin puller is announced by the Nelson Dowel Holder Co.

The rig is manually cranked along the edge of a paving slab. Besides pulling the form stakes with ease, the machine prevents the bending of pins and damage to the forms or the slab, according to the manufacturer.

Power for the unit is delivered by a Kohler Model K161 engine.

For further information write to the Nelson Dowel Holder Co., Dept. C&E, Lebanon, Tenn., or use the Request Card that is bound in at page 18. Circle No. 69.

Spanning excavation and form bracing to move concrete from the transit-mix truck into the forms is a typical use for the Faircrete conveyor. The unit pictured employed by the Mal-Bros. Co. of Newark, N. J., is pouring footings for the new freight hangars located at the Port of Newark. According to the company, the conveyor spanned the excavation easily, and provided up to 40 yards of concrete per hour. For further information about the Faircrete conveyor write to **The Fairfield Engineering Co.**, Dept. C&E, 324 Barnhart St., Marion, Ohio, or use the Request Card at page 18. Circle No. 29.



With a gross weight of only 7 tons, Tampo's Model C-40 tow-type vibratory roller features compacting power ranging up to 40 tons.

Vibratory roller offers 30 to 40-ton compaction

A tow-type vibratory roller offering 30 to 40-ton compaction, with a gross weight of 7 tons, is announced by the Tampo Mfg. Co.

Designated Model C-40, the unit has a roll width of 51 inches, and is 11 feet 3 inches long, 60 inches high, and 61 inches wide. Power is supplied by a Hercules Model C2-90 air-cooled 30-hp valve-in-head engine.

On the C-40, a combination of pneumatic and rubber shock mounting reportedly isolates the roller from vibratory shock. Vibration frequency is variable by throttle setting, and is remotely controlled from the operator's seat.

For further information write to the Tampo Mfg. Co., Dept. C&E, P. O. Box 2340, San Antonio 6, Texas, or use the Request Card at page 18. Circle No. 4.

Announce new form tie with break-back design

Gates & Sons, Inc., announces a new break-back form tie. Called PlastiCone, the tie is designed to produce a positive break-off 1 inch or 1½ inches back from the surface of the finished concrete.

According to the manufacturer, the device incorporates a molded poly-

ethylene cone which is inserted in each end of the form tie. It envelopes the tie from the point of breakoff, out to the surface of the wall, thus preventing excess bleed at the tie slot. The company points out that PlastiCone ties can be removed, with practically no spalling, immediately after forms are stripped.

Another advantage of the cones is that they require no oiling or special treatment, since concrete cannot adhere to the glass-smooth surface.

For further information write to Gates & Sons, Inc., Dept. C&E, 80 S. Galapago, Denver 23, Colo., or use the Request Card at page 18. Circle No. 55.

For further information on any product described in this section, circle the indicated number on the Request Card at page 18.

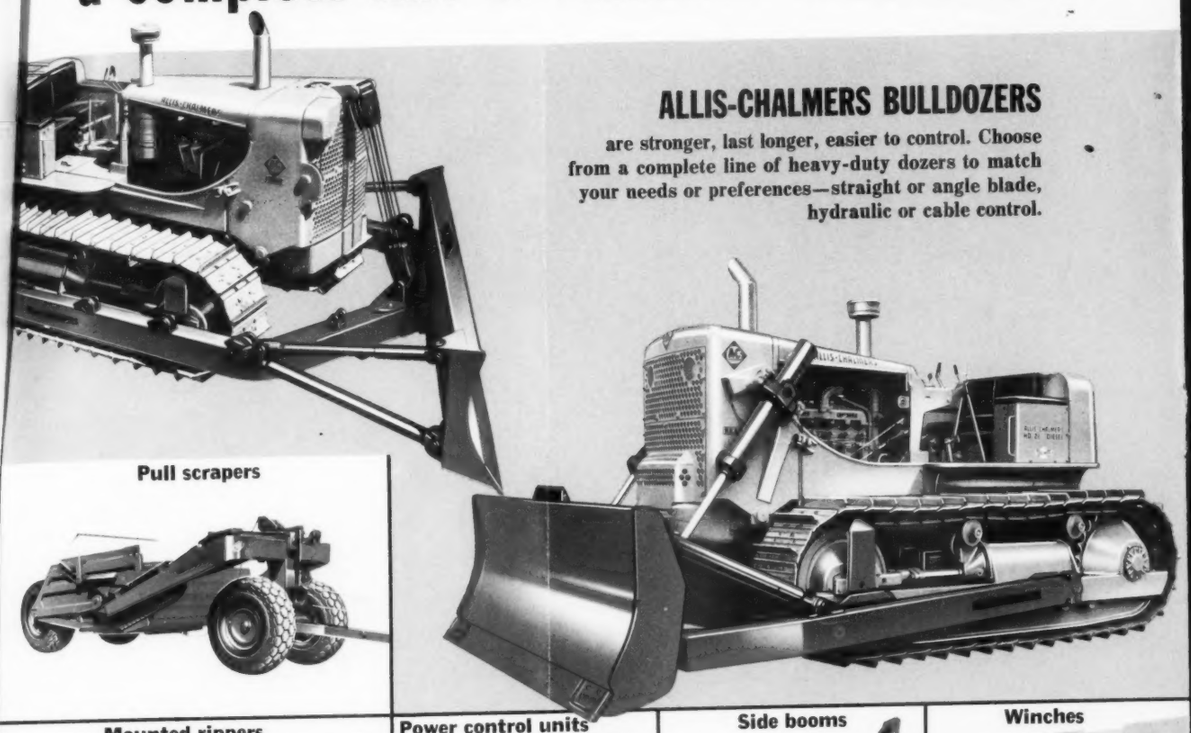
New 115-volt generator mounts on vehicle engines

A 115-volt ac generator, designed for users of portable lighting and electric power tools, is available from Electric Controls, Inc. The 1,000-watt unit, designated Model DSD, is a small and compact unit, easily mounted to vehicle engines.

The dash-mounted controls include throttle control, control meter, dc field excitation fuse, toggle on-off switch, indicator pilot light, and ac load fuse.

For further information write to Electric Controls, Inc., Dept. C&E, Wales, Wis., or use the Request Card at page 18. Circle No. 116.

a complete line of matched attachments



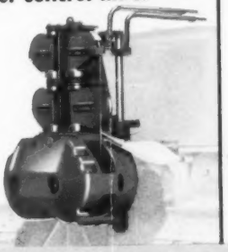
ALLIS-CHALMERS BULLDOZERS

are stronger, last longer, easier to control. Choose from a complete line of heavy-duty dozers to match your needs or preferences—straight or angle blade, hydraulic or cable control.

Pull scrapers

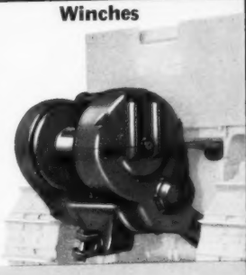
Mounted rippers

Power control units



Side booms

Winches



A demonstration on your job will prove their value . . . call your Allis-Chalmers dealer now.

Look ahead...*move ahead*...and stay ahead

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

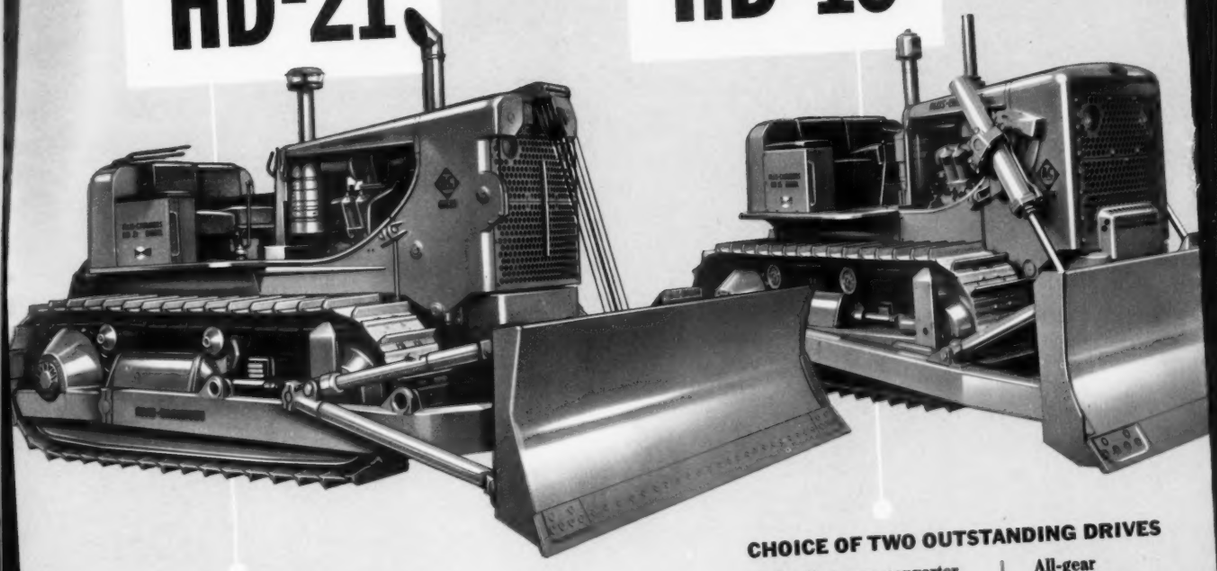
FORM MS-1303

LITHO. IN U.S.A.

There's an extra measure of
IN EVERY SIZE

ALLIS-CHALMERS
HD-21

ALLIS-CHALMERS
HD-16



225-hp turbocharged engine
Hydraulic torque converter drive
56,260 lb (approx. as shown)

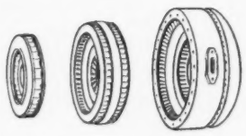
The new HD-21 brings you live power for today's big-tractor jobs—and torque converter drive puts it to work automatically. The HD-21 offers more work capacity—dollar for dollar—than any other big crawler tractor you can buy.
HD-21A illustrated—Two other models available

CHOICE OF TWO OUTSTANDING DRIVES

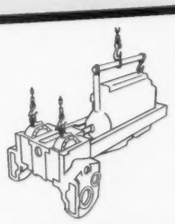
Hydraulic torque converter	All-gear
150 net engine hp	141 belt hp
39,090 lb (approx. as shown)	125 drawbar hp

Get up on the HD-16 yourself—and see how it handles jobs ordinarily assigned only to bigger, more expensive crawler tractors. You'll sell yourself—just as more keen-eyed construction men do every day.
HD-16DC illustrated—Five other models available

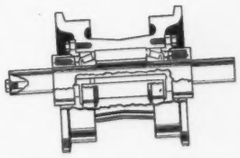
Pioneered and proved by Allis-Chalmers Engineering in Action



Torque Converter Drive gets more work done—automatically provides the right pull or push for every load, at maximum speed for existing conditions. *(Available in HD-21 and HD-16 only.)*



Unit Construction saves valuable time . . . lets you remove any major assembly without disturbing adjacent assemblies.



1,000-Hour Lubrication intervals for truck wheels, idlers, support rollers . . . changes daily greasing time into production time.

THE ONLY COMPLETE LINE OF CRAWLER TRACTORS THAT

performance and dependability

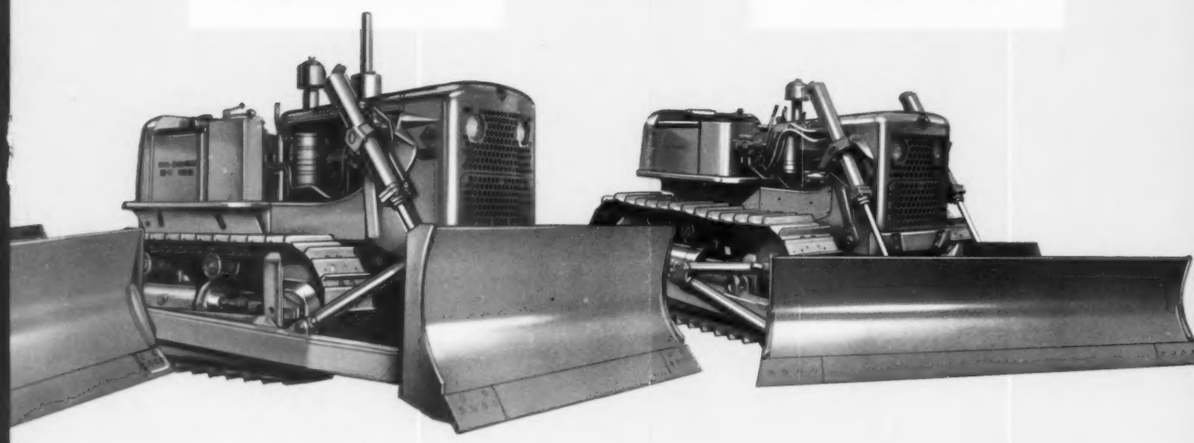
..A SIZE FOR EVERY JOB

ALLIS-CHALMERS

HD-11

ALLIS-CHALMERS

HD-6



94 belt hp

25,960 lb (approx. as shown)

The HD-11 is setting new standards in its size range . . . offers you dozens of work-boosting advantages, including the industry's easiest shift pattern. A single shift takes it from any forward speed to any reverse—gets short-cycle jobs done faster, easier.

HD-11B illustrated—Two other models available

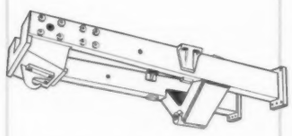
63 belt hp

16,470 lb (approx. as shown)

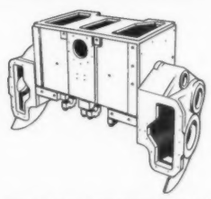
Here's up to 15,500 lb drawbar pull. The HD-6 is the only tractor near its size with big-tractor design advantages—for example, All-Steel Box-A main frame and engine-mounted dozer with direct-lift cylinders for improved weight distribution, accurate dozing and long life.

HD-6E illustrated—Three other models available

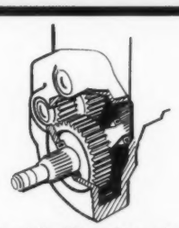
True-Dimension Track heat-treated and machined in the industry's most modern facilities, is setting new track-life records on every type of work.



All-Steel Box-A Main Frame soaks up shock and strain . . . provides improved weight distribution and equipment mounting.



One-Piece Steering Clutch and Final Drive Housing with extreme rigidity and strength . . . line-bored to provide precise alignment of gears and shafts.



Straddle Mounting of All Final Drive Gears with tapered roller bearings on both sides of short, large-diameter shafts . . . provides extra gear life.

GIVES YOU ALL THESE ADVANTAGES IN EVERY SIZE..PLUS

s the
van-
and
im-
life.
e

f All
bear-
short,
. . .
fe.

S

Look ahead
...*move ahead*
...and stay ahead
with
Allis-Chalmers
crawler tractors

first choice on more and more tough jobs

Four big advantages stand out in the coast-to-coast swing to Allis-Chalmers crawler tractors:

- **outstanding work capacity**
- **real dependability under severe conditions**
- **easy maintenance and lubrication**
- **timesaving, cost-cutting service**

As a result, Allis-Chalmers users bid closer to the belt, set schedules with more confidence, end up "in the black." So before you buy your next tractor, take a close look at *these* machines . . .

This self-powered concrete bucket utilizes the weight of its load to generate the hydraulic pressure needed to operate the opening and closing mechanism. The Blaw-Knox unit literally hangs on two hydraulic cylinders. The operator merely turns a hydraulic valve to open the bucket, and releases the valve to close it. Every time the bucket is set down the cylinder is, in effect, recharged. An auxiliary radio remote-control system is also available. For further information write to the **Blaw-Knox Co.**, Dept. C&E, P. O. Box 1198, Pittsburgh, Pa., or use the Request Card at page 18. Circle No. 72.

←For more facts on insert, circle No. 279

Round column forms for single-use jobs

The Deslauriers Column Mould Co., Inc., announces its Econ-O-mold fiber form for round concrete columns.

Econ-O-mold is especially designed for jobs requiring single use or a limited number of round concrete columns of any type, including underpinning, stub columns, quarter, half, and obrotund columns. Lightweight, easy to store on the job, and easy to saw to fit any size column, Econ-O-mold requires fewer men to handle and erect. According to the manufacturer, only minimum bracing is needed for either spiral or straight steel reinforcements.

Standard 18-foot lengths are available in 3-inch to 48-inch ID.

For further information write to the Deslauriers Column Mould Co., Inc., Dept. C&E, 5036 W. Lake St., Chicago 44, Ill., or use the Request Card at page 18. Circle No. 30.

Swing-type side extension brackets on this Transport Trailers unit provide the width where needed for big equipment.

Triple-axle trailer for weighty equipment

The Model GTX heavy-duty triple-axle trailer is offered by Transport Trailers, Inc.

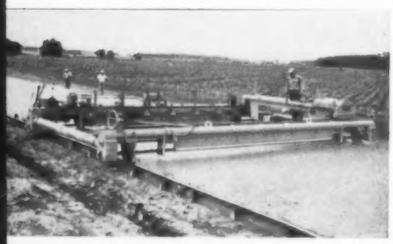
Available in sizes from 30 to 100 tons, the unit has a removable gooseneck, and standard and extended beavertails. The triple-axle assembly is equipped with three full-width cambered tubular axles, allowing both lengthwise and crosswise oscillation. Heavy-duty rubber bushed radius rods prevent axle rotation and maintain positive axle alignment. This over-all design assures equal distribution of weight on each axle, according to the manufacturer of the unit.

For further information write to Transport Trailers, Inc., Dept. C&E, P. O. Box 968, Cedar Rapids, Iowa, or use the Request Card at page 18. Circle No. 106.

Road finishing float has several improvements

A new Rex longitudinal float is announced by the Chain Belt Co.

The machine features a carriage which travels transversely between the tubular frames on a set of single crown rails. Crown adjustment is made through a single point handwheel control at the front and rear of the machine for each crown rail. An independent power unit on the floating carriage allows independent control of carriage speed and traction speed. An automatic mechanical trip lever on the unit reverses carriage direction at each end of the cycle.



The basic frame members on the machine are of tubular construction for additional strength, with flanged frame corner connections for fast and easy disassembly.

The machine is supplied in two basic width adjustments, 10 to 15 feet and 20 to 25 feet.

For further information write to the Chain Belt Co., Dept. C&E, 4701 W. Greenfield Ave., Milwaukee 14, Wis., or use the Request Card at page 18. Circle No. 93.

Announce pre-amplifier for two-way radios

A 450-mc pre-amplifier unit for two-way radios, designed to increase the sensitivity of the receiver at the office location, is announced by General Electric.

The company points out that the new device improves the effective talk-back range of mobiles associated with the system without the necessity of adding equipment to the radio unit in the car itself. However, the pre-amplifier can be used in the car.

The use of the unit at the station receiver provides a range increase equivalent to an increase of four times the power of a mobile transmitter, according to the manufacturer.

For further information write to the General Electric Communication Products Dept., Section P, Dept. C&E, Electronics Park, Syracuse, N. Y., or use the Request Card at page 18. Circle No. 92.

Flotation tire and wheel or tire and rim assemblies, especially designed for use with graders, loaders, and other heavy off-the-road equipment, are available from the Harmo Tire & Rubber Corp. WB-22 flotation tires will fit Caterpillar, Austin-Western, Adams, and other motor graders, and Hough, Case, Michigan, Trojan, Koehring, and other power loaders. These tires are claimed to give twice the ground contact area of conventional tires, and enable heavy equipment to operate without stalling on slopes as steep as 40 per cent, or in loose sand, heavy muck, or other adverse operating conditions. They do not change the gear ratio or otherwise affect the operation of the equipment. For further information on WB-22 flotation tires, write to the **Harmo Tire & Rubber Corp.,** Dept. C&E, 1050 18th St., Detroit 16, Mich., or use the Request Card at page 18. Circle No. 54.

120 "EUCS" at Oahe Dam...

For all big tractor jobs — push-loading large scrapers, heavy dozing, ripping hard shale and pulling big equipment — the TC-12 is a top performer. Independent track drive, full power shift with Torqmatic Drives and a total of 402 h.p. delivered to the power train give this Euclid "Twin" unequalled work-ability. Western has had TC-12 crawlers in their fleet for over 3 years . . . is using 18 of them at Oahe.

▲ *A total of 518 h.p., Torqmatic Drives, power on all four wheels, big capacity and a loading assist by Twin-Power "Euc" Crawlers, add up to high speed production. Here a TS-24 gets a heaped load of about 20 bank yds. of heavy shale in just over a half minute. "Twin" availability has been 90% or better in spite of working 20 hours a day, six days a week in tough material.*

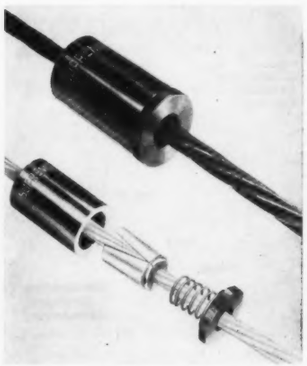
Another application of Euclid "Twin-Power" is the 50-ton Model LLD. Western Contracting has used this size rear-dump for several years on big jobs such as the Indiana Turnpike, Ft. Randall, Gavins Point and Oahe Dams. With two 300 h.p. engines, each powering a separate axle through Torqmatic Drives, this "Euc" moves 50-ton loads over steep grades at fast travel speeds. ▶

For more data on any item, circle indicated number on card at page 18.

New strand chuck has instant grip

A new strand chuck for prestressing is offered by the Supreme Products Corp. The unit is said to grip instantly, with no tools required.

According to the manufacturer, the jaws automatically assume the proper grip on the strand, and the chuck is



designed to withstand all tensions encountered in prestressing. Exceptional ease of removal is another feature claimed.

The jaws are made of fine chrome molybdenum alloy steel with precision-cut thread, and may be re-used an indefinite number of times. The barrel of the chuck is of high-tensile steel, and works for both 7/16-inch and ⅜-inch wire strand.

For further information write to the Supreme Products Corp., Dept. C&E, 2222 S. Calumet Ave., Chicago 16, Ill., or use the Request Card at page 18. Circle No. 134.

Device flashes warning when tire pressure drops

A device that flashes a dashboard warning when a dangerous drop in the pressure of a truck tire occurs is available from the Tel-Air Corp.

This metering device attaches to the hub of each wheel, and connects to the valve stem of either single or dual tires. Metering is pre-set for any desired pressure, and a small red dashboard warning light flashes an instantaneous signal if the pressure in any tire drops.

For further information write to the Tel-Air Corp., Dept. C&E, 4250 Harry Hines Blvd., Dallas, Texas, or use the Request Card at page 18. Circle No. 110.

← For more facts, circle No. 282

The IH 460 tractor, on the left, has an IH Pippin 360 backhoe with new attachment for carrying the Joy pneumatic drill. On the right, another IH Pippin 360 is rigged with an orange peel bucket for cleaning catch basins.

Preview new line of wheel tractors

After three years of research and development and at a cost of over $22 million, the International Harvester Co. has come up with a completely new line of tractors. The units were previewed recently in Hinsdale, Ill., with the demonstration attended by some 8,500 dealers throughout this country and Canada.

Designed for more power and versatility, the commercial tractors are available in six power sizes and many different models.

The six new commercial tractors range in size from 12.8 engine horsepower for the Cub Lo-Boy, to 72 engine horsepower for the larger International 560. New power steering is a feature, as well as a wide selection of gasoline, LP gas, distillate, or diesel engines.

The larger models are equipped with a torque amplifier, a planetary gear unit which will give ten speeds forward and two in reverse. Without stopping or shifting gears, the operator can reduce the speed of travel and increase the pull power up to 45 per cent.

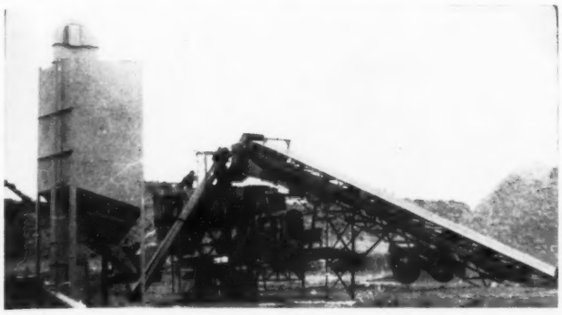
Another planetary gear assembly speeds up dozing and power loading. This "fast-reverser" attachment permits the operator to move backward and forward without shifting transmission gears. In any gear, the tractor backs away at speeds approximately 25 per cent faster than it moves forward.

Of special interest to contractors are two larger 6-cylinder models: the Model 460 utility tractor with 61 engine horsepower and the Model 560 with 72 engine horsepower. Five forward speeds and one reverse are standard in both models.

Mounted on an International TD-6, a Drott 4-in-1 bucket utilizes its clamshell action to pick up a big stump.

The tractors may be equipped with a complete new line of International Wagner front-end loaders and Pippin backhoes. For the hydraulic backhoe, Pippin also makes a special clip to hold a pneumatic rock drill.

For further information write to the International Harvester Co., Dept. C&E, 180 N. Michigan Ave., Chicago, Ill., or use the Request Card at page 18. Circle No. 100.



On the Hetherington & Berner stabilizers, push-button operation through the use of electric drives insures the uniform proportioning of materials into the mixer at all times.

Large-capacity stabilizers are push-button plants

Hetherington & Berner, Inc., announce the addition to their line of asphalt equipment of two new large-capacity stabilizers.

One of these plants has a capacity of 300 to 400 cubic yards per hour; the other produces 200 to 250 cubic yards per hour. Both are unit-type plants, with individual units operated by either direct diesel or electric drives.

The feeder, aggregate conveyors, and mixer are wheel-mounted, and may be operated in running position without jacking up on cribbing.

An electric generator set, driven from the diesel engine, is available on either of these mixers as optional equipment. Bulk-cement handling can also be provided, if desired.

For further information write to Hetherington & Berner, Inc., Dept. C&E, 701–745 Kentucky Ave., Indianapolis 7, Ind., or use the Request Card that is bound in at page 18. Circle No. 114.

Mobile 2-way radiophone for 450 to 470 mc band

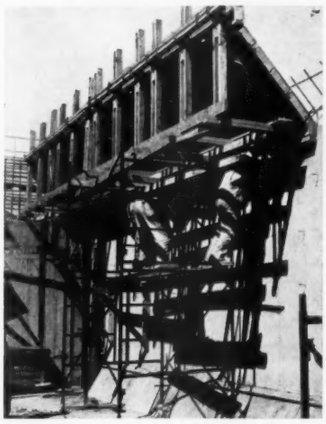
Motorola announces a new mobile 2-way radiophone operating in the 450 to 470 mc frequency band.

The unit features a transistorized power supply and a unified chassis design which combines transmitter, receiver, and power-supply portions of the unit on one chassis.

The new Motorola model weighs 34 pounds, and is packaged in a 10-inch housing, enabling both under-dash and trunk mounting. It provides 18 watts transmitter power output and 3 watts receiver output. It is available in both carrier squelch and dual squelch Private Line (carrier plus tone-coded squelch) versions. The unit operates from a 12-volt electrical system, positive or negative ground.

For further information write to Motorola Communications & Electronics, Inc., Dept. C&E, 4501 W. Augusta Blvd., Chicago 51, Ill., or use the Request Card at page 18. Circle No. 9.

Gang Forming Licks "Y" Wall Problem



Pays Off in Quality Pours, Speed and Reduced Costs

2,665 lineal feet of "Y" walls and half "Y" walls, with 16'9" high walls on tank addition to sewage treatment plant—that was the pouring problem faced by contractors, Wander & Mason of Worthington, Ohio. They solved the problem by pouring the walls in three lifts with the forms ganged for the final "Y" and half "Y" pours.

On the "Y" walls Symons panels, fillers and bay corners were ganged in 16-foot sections. One 16-foot outside section was stripped, moved to the next wall section and reset by three men in 20 minutes.

Symons Forms, Shores and Column Clamps can be rented with purchase option. Information on Symons products is available upon request. Symons Clamp & Mfg. Co., 4251 Diversey Avenue, Dept. J-8, Chicago 39, Illinois.

To obtain further information on any of the products described in this section, circle the number given at the end of the item on the Request Card at page 18.

Weight savings gained with this Schetky bottom-dump unit reportedly permit an additional payload of 2,320 pounds.

Announce bottom dumper made of welded aluminum

A welded aluminum bottom-dump truck for hauling and spreading gravel, hot asphalt mix, and other highway construction materials is announced by the Schetky Equipment Corp.

The 3,680-pound unit has a capacity of 9 cubic yards. It is 17 feet 7 inches long and 7 feet 4 inches high.

The truck has a 90-inch-wide V-shaped hopper completely free from any interior bracing across the full width of the chassis, thus permitting a uniform dump while the trailer is moving.

For further information write to the Schetky Equipment Corp., Dept. C&E, 1810 Southeast Tenth Ave., Portland 14, Ore., or use the Request Card at page 18. Circle No. 105.

Concrete admixture is retarding agent

Sonotard, a retarding agent recommended for use in precast, prestressed, and post-tensioned concrete, is available from L. Sonneborn Sons, Inc.

This admixture contains no calcium chloride, and may be used with either Type I or Type III cement.

According to the manufacturer, Sonotard produces greater strength under conditions of accelerated curing at elevated temperatures; permits water-cement reduction, with no sacrifice in workability, and in conformity with Abrams Law; and permits cement economy under these conditions with no strength sacrifice.

For further information write to L. Sonneborn Sons, Inc., Building Products Division, Dept. C&E, 404 Fourth Ave., New York 16, N. Y., or use the Request Card at page 18. Circle No. 31.

Compact power tamper is self-propelled

A self-propelled, compact power tamper for packing down earth backfill in trenches and around foundations and piers, and for blacktop paving and patching, is announced by the Kelley Machine Division of the Wiesner-Rapp Co., Inc.

The Model 18KT has an 18-inch-wide shoe, with a 24-inch shoe also available. To prevent blacktop sticking to the shoe, a special heater at-

tachment can be furnished.

The Kelley power tamper is powered by a 4-cycle 3.5-hp gasoline engine said to deliver 2,400 one-ton impacts per minute. Shock-absorbing handles prevent transmission of vibration to the operator, according to the manufacturer.

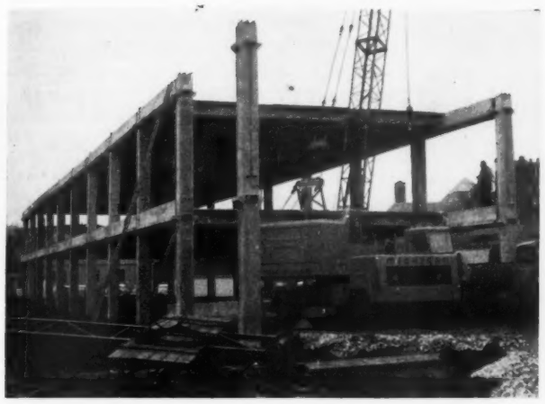
For further information write to the Kelley Machine Division, Wiesner-Rapp Co., Inc., Dept. C&E, 283 Hinman Ave., Buffalo 23, N. Y., or use the card at page 18. Circle No. 87.

Off-the-road truck tire increases wear, traction

A new off-the-road truck tire, squared off and widened in the shoulder area to give improved wear and traction, is announced by The Goodyear Tire & Rubber Co.

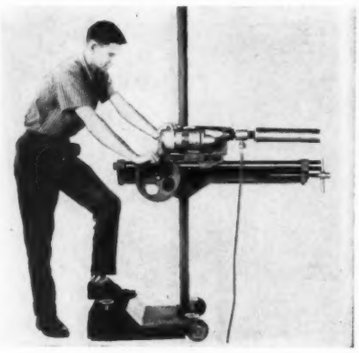
Named the Super Hard Rock Lug, the tire is made in all wide-base sizes and is available in tubeless and tube-type versions. It is built with special cut-resisting rubber compounds and triple-tempered 3-T nylon cord.

For further information write to The Goodyear Tire & Rubber Co., Dept. C&E, 1144 E. Market, Akron 16, Ohio, or use the Request Card at page 18. Circle No. 126.



Precast and prestressed members comprise the entire structural frame of the Joliet Technical-Vocational High School, Joliet, Ill. Supplied by Crest Concrete Systems, Inc., the double-tee slabs used spanned 40 feet with a 100 and 130-pound live load. For further information about its prestressed building members, write to **Crest Concrete Systems, Inc.**, Dept. C&E, P. O. Box 38, Lemont, Ill., or use the Request Card at page 18. Circle No. 56.

For more facts on these products, circle the indicated number on the Request Card at page 18.



The new Molco machine will drill holes up to 6 inches in diameter through concrete, in any direction.

Concrete-drilling machine drills in any direction

A new lightweight concrete-drilling machine that swivels 360 degrees to allow drilling in any direction is announced by Molco Drilling Machines, Inc.

Using special thin-wall diamond core bits, this machine reportedly will drill holes as large as 6 inches in diameter through concrete or any other hard building material at the rate of one inch per minute.

Core drilling machines which presently drill only horizontally can be converted to 360-degree drilling by a special kit.

For further information write to Molco Drilling Machines, Inc., Dept. C&E, 1100 20th St. N. W., Washington, D. C., or use the Request Card at page 18. Circle No. 135.

Double-tee form header assembly

A new Form-Crete dual header assembly and cable spacer for prestressed double-tee forms is offered by the Food Machinery & Chemical Corp.

The face plate is shaped to fit the

tapered contours of the channels, particularly the top curve, so that there are no open spaces. Each of the plates is in two sections and is adjustable so that it can be expanded or compressed to fit snugly against the sides of the channels. The width between the two plates can also be adjusted to fit any variations of the form.

The unit is fitted with a locking clip to hold it in the proper plane.

For further information write to the Food Machinery & Chemical Corp., Dept. C&E, P. O. Box 1718, Lakeland, Fla., or use the Request Card at page 18. Circle No. 73.

New 6-inch transit offers many features

A 6-inch Eagle transit with a 20-second or 1-minute vernier reading is offered by the Texas-Asiatic Import Co.

This Japanese-built unit comes equipped with stadia arc, reversion telescopic vial, and ribbed horizontal

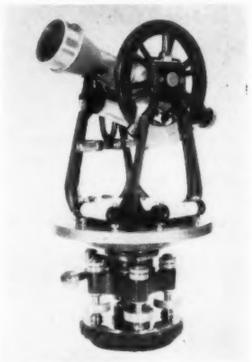


plate. All parts except compass, circle guard, and objective lens outer tube are made of solid bronze.

For further information write to the Texas-Asiatic Import Co., Dept. C&E, 2127 Fort Worth Ave., Dallas, Texas, or use the Request Card at page 18. Circle No. 136.

Concrete-softening agent speeds breaking, drilling

Chem-Break, a chemical said to exert a solvent action on portland cement and other masonry surfaces, is offered by the Lee, Revere & Van Buren Chemical Co.

The chemical is simply dissolved in cold water and poured onto the concrete surface. According to the manufacturer, it is safe to use near brick and metals, and gives off no fumes. It is especially recommended for concrete breaking and drilling work.

For further information write to the Lee, Revere & Van Buren Chemical Co., Dept. C&E, 432–436 W. 70th Terrace, Kansas City 13, Mo., or use the Request Card at page 18. Circle No. 83.

Horsepower has been increased to 335, and capacity boosted to 21 yards struck and 28 yards heaped, on the Model B Tournapull. The new standard engine is a Cummins 6-cylinder 4-cycle diesel. According to the manufacturer, the Model B with standard step gear transmission is now capable of low-range speeds up to 20.7 mph; in high range, top speed has been increased to 30.1 mph. For further information write to the **LeTourneau-Westinghouse Co.,** Dept. C&E, 2301 N. Adams St., Peoria, Ill., or use the Request Card at page 18. Circle No. 57.

Men swab Poco soluble compound on metal forms in the yard of the Hardaway Contracting Co., Port Tampa City, Fla. ▼

Concrete-curing compound is dual-purpose membrane

A white-pigmented curing compound for highways and other exterior concrete surfaces is available from the A. C. Horn Cos.

The dual-purpose compound, Horncure 40W, reportedly enables concrete to retain 95 per cent or more of the mixing water for 7 days, permitting the concrete to develop proper compression and flexural strength. Because it reflects the heat of the sun, it prevents uneven thermal expansion and premature cracking of the concrete. The white pigmentation also insures uniform coverage by simple visual observation.

A membrane, applied by spray in a single operation, Horncure 40W eliminates the use of burlap, sand, and straw, and does not require watering while the concrete sets.

For further information write to A. C. Horn Cos., Dept. C&E, 750 Third Ave., New York 17, N. Y., or use the Request Card at page 18. Circle No. 125.

Parting lubricant for concrete forms

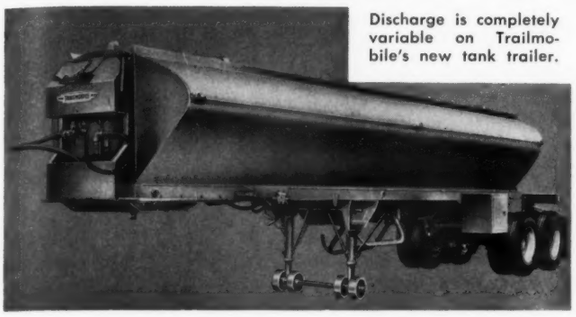
Poco soluble compound, a parting lubricant for metal concrete forms, said to produce an exceptionally smooth finish on precast and prestressed members, is available from The Pure Oil Co.

With forms having a sharp radius, or intricate shapes, Poco eliminates blow-holes or pin-holes, the manufacturer states. It improves the flow properties of the concrete and decreases the air entrainment at the surface.

The compound reportedly permits easy and clean form stripping, and is easily applied by spraying, brushing, or swabbing.

For further information write to The Pure Oil Co., Dept. C&E, 35 E. Wacker Drive, Chicago 1, Ill., or use the Request Card at page 18. Circle No. 19.

For further information on any product described in this section, circle the indicated number on the Request Card at page 18.



Discharge is completely variable on Trailmobile's new tank trailer.

Bulk-cement tank trailer has hydraulic discharge

A new all-steel bulk-cement tank trailer is announced by Trailmobile, Inc. The unit features a completely variable, hydraulically powered discharge system, with a two-stage step-down, continuous-contour design.

Besides hydraulic control, the new system offers a third screw. The independent control of each screw in either direction permits freeing of screws if they become load-bound during the discharge operation. This arrangement also allows for optional center discharge.

Other specifications include four 20-inch-diameter fill hatches with watertight, foot-operated covers.

For further information write to Trailmobile, Inc., Dept. C&E, 31st and Robertson Ave., Cincinnati 9, Ohio, or use the Request Card at page 18. Circle No. 13.

For further information on any product described in this section, circle the indicated number on the Request Card at page 18.

Solid wire-rope thimble for pins up to 2½ inches

A new solid wire-rope thimble with a large radius to minimize rope bending is offered for use with open sockets, wedge sockets, and the new Crosby-Laughlin boom pendant clevis.

A steel casting, the new thimble is

available for all sizes of wire rope from ½ inch to 1⅜ inches, for use with pins from 1 inch to 2½ inches in diameter.

The manufacturer reports that a special casting process assures uniform, smooth-sided pin holes and an unusually smooth score in every thimble.

For further information write to the Crosby-Laughlin Division, American Hoist & Derrick Co., Dept. C&E, Box 570 FY, Fort Wayne, Ind., or use the Request Card at page 18. Circle No. 137.

Plastering machine has 3-cfm capacity

A self-contained all-purpose plastering machine, designated Plaster-Master Model D, is available from the Santa Anita Mfg. Corp.

Standard equipment for the unit includes 75 feet of hose, gun, sifting screen, and towbar. Power is supplied by a Wisconsin 18-hp 2-cylinder engine.

According to the manufacturer, the Model D will pump all plastering materials: straight sand, lightweight aggregates, or mixtures, with hardwall gypsum, portland cement, or other binders. The unit has a pumping capacity of 3 cfm.

The Model D is 46 inches high, 46 inches wide, and 77 inches long (without towbar).

For further information write to the Santa Anita Mfg. Co., Dept. C&E, 4961 Double Drive, Temple City, Calif., or use the Request Card at page 18. Circle No. 8.

A new spring-mounted oscillating front axle is standard on the Lorain ⅜-cubic-yard self-propelled Model SP-107 rubber-tire excavator. This new design allows the front wheels to hug the ground so that the four-wheel-drive can apply the tractive effort necessary to carry the unit over rough or soft terrain. When maximum crane lifting capacities are needed for crane operation, the front spring can be "locked out" easily, to give solid-axle, full 7-ton capacity over front, rear, and sides without setting outriggers. For further information write to the **Thew Shovel Co.**, Dept. C&E, 28th and Fulton Road, Lorain, Ohio, or use the Request Card at page 18. Circle No. 66.

Portable floodlight unit generates own power

A floodlight trailer unit that generates its own electric power is announced by Pacific Mercury.

Designated Mobilite, this unit is equipped with four floodlights, and is available with 320,000 or 480,000 candlepower. The lights can be individually adjusted to any desired height up to the maximum 18-foot extension, and pivot in a complete circle.

For further information write to Pacific Mercury, Dept. C&E, 14052 Burbank Blvd., Van Nuys, Calif., or use the Request Card at page 18. Circle No. 26.

New device announced for quick form alignment

A new device for form alignment, said to permit preliminary and final form adjustment without disturbing braces, is offered by Superior Concrete Accessories, Inc.

Providing a swivel action for quick positioning and adjustment, the Adjusta-Brace consists of two units connected by a 2×4, or 2×6, or a 1-inch-ID pipe. Either unit may be attached to the wall form, or to the stake, as field conditions dictate.

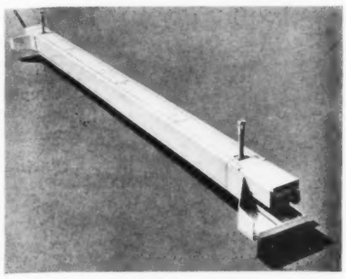
The manufacturer points out that the Adjusta-Brace permits maximum adjustment in any direction, at any angle.

For further information write to Superior Concrete Accessories, Inc., Dept. C&E, 9301 King St., Franklin Park, Ill., or use the Request Card at page 18. Circle No. 44.

New concrete screed speeds crown finishing

Designed to speed rigidly specified crown finishing on highway and airport paving projects, a new quickly adjustable concrete finishing screed is available from the Blaw-Knox Co.'s Construction Equipment Division.

For use with the firm's Model XE concrete paving finisher, the screed is



The rigidity of the Blaw-Knox screed, and its cam mechanism, reportedly assures a specific contour in transition from crown to flat and flat to crown at intersections and curves.

said to feature simple cam adjustments to produce over 18 crowns, as well as good crown-to-flat-to-crown transition for continuous, rapid finisher operation.

A graduated needle-pointer gage facilitates fast, accurate adjustment of the cam mechanism, which can be set for circular, parabolic, or modified V crowns with a minimum of time and effort. A reversible ratchet wrench switches the screed from flat to crown, and back, as required.

The Model 5M screed is adjustable from 20 through 25-foot road widths in 6-inch stages.

For further information write to the Blaw-Knox Co., Construction Equipment Division, Dept. C&E, 40 Charleston Ave., Mattoon, Ill., or use the Request Card at page 18. Circle No. 64.

Portable aggregate plant produces up to 100 tph

The Nomad portable aggregate plant is announced by Engineered Equipment, Inc.

The unit features a basic 5-yard batcher, available with or without integral high-capacity conveyor, for front-end-loader charging. This unit comes complete with a dial scale which enables the loader operator to make visual checks of accumulated weighing.

Simply by adding a "bolt-on" 30-ton surge bin, charging time is cut to seconds and capacities increased to as high as 100 tph, the manufacturer claims.

Pneumatic-tire trailer wheels and towing hitch are optional equipment.

For further information write to Engineered Equipment, Inc., Dept. C&E, 1001 Linden Ave., Waterloo, Iowa, or use the Request Card that is bound in at page 18 of this issue. Circle No. 61.

Forged scarifier tips for motor graders

Forge-Temp replaceable forged scarifier tips for motor graders have been added to the Bucyrus Blades line. The forged tips offer an improved toughness and shock resistance, with high strength, according to the company.

For further information write to Bucyrus Blades, Inc., Dept. C&E, Bucyrus, Ohio, or use the Request Card at page 18. Circle No. 94.

On the recent construction of the Wolcott Avenue Bridge near Hartford, Conn., American Super-Tens stress-relieved wire was used for the cast-in-place prestressed slab and girder work, done on the site. The project reportedly was made easier by the use of Super-Tens wire since it has no tendency to return to the original coil diameter, thus permitting easier, accurate placement in the forms. For further information on Super-Tens stress-relieved wire, write to American Steel & Wire, division of **United States Steel Corp.**, Dept. C&E, 1420 Rockefeller Bldg., Cleveland 13, Ohio, or use the Request Card at page 18. Circle No. 119.

A 72-inch-wide roll is an important feature on the Model VR-72-T. The unit has an approximate net weight of 8,100 pounds.

New vibratory roller has 72-inch-wide roll

The Model VR-72-T high-frequency vibratory roller is announced by the Essick Mfg. Co.

Designed to be pulled by tractors equivalent in size to the Caterpillar D4, the machine features a roll 72 inches wide, with a 51-inch diameter. Its vibratory shaft reportedly rotates at 2,320 rpm.

Power is supplied by a Continental Model F-226 engine, developing 59 horsepower at 1,800 rpm. The manufacturer states that the VR-72-T travels at speeds from 1 to 4 mph, depending on the material.

The 8,100-pound machine has overall measurements of 12 feet 4 inches long, 7 feet 5 inches wide, and 5 feet 6 inches high.

For further information write to the Essick Mfg. Co., Dept. C&E, 1950 Santa Fe Ave., Los Angeles 21, Calif., or use the Request Card at page 18. Circle No. 85.

New air-operated drill for hard rock formations

The Hammerdril, an air-operated impact tool for high-speed drilling in hard rock formations, is available from the Mission Mfg. Co.

The tool is offered in both low and high-pressure models, and reportedly can be adjusted to deliver up to 6,000 strokes per minute. There are only three moving parts in the low-pressure unit; in the high-pressure unit, only two. Either model can be used on any standard rotary rig with suitable air-compressor capacity.

An important component of this bottom-hole tool is the specially designed Hammerbit, through which all air exhausts against the cutting face. The air holes are positioned to blast chips off the bottom, and the bit, according to the manufacturer, may be resharpened in the field many times. Bit sizes are 4½ and 4¾ inches for the 3⅞-inch-OD tool; and 6, 6½, 6⅝, and 7 inches for the 5¼-inch-OD unit.

For further information write to the Mission Mfg. Co., Dept. C&E, P. O. Box 4209, Houston, Texas, or use the Request Card at page 18. Circle No. 20.

Workmen apply form lubricant to double-tee molds with a standard spray paint pot. Available from the Shell Oil Co., the compound permits quick stripping of concrete beams and pipes, leaves concrete with a glossy surface and does not build up on the forms, according to the company. In addition it "sets" almost on contact, and cannot be squeezed out by the pressure of wet concrete or tamping. No clean-up of forms is necessary after stripping of members, the company claims. For further information about this form release agent, write to the **Shell Oil Co.**, Dept. C&E, 50 W. 50th St., New York 20, N. Y., or use the Request Card at page 18. Circle No. 45.

Patch roller kit fits any dump truck

A completely self-contained patch roller kit, which can be attached easily to any dump truck, is available from The American Coleman Co.

Called Tar-Baby, the unit attaches to the rear of the truck and uses the weight of the truck to compact the blacktop patching material.

Except for the addition of a single control valve, the Tar-Baby can use the present hydraulic system on any dump truck.

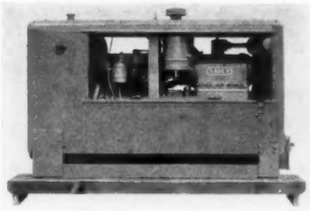
For further information write to The American Coleman Co., Dept. C&E, Littleton, Colo., or use the Request Card at page 18. Circle No. 91.

New 125-cfm compressor cross-mounts on trucks

A 125-cfm compressor for cross-mounting on motor trucks is announced by the Davey Compressor Co. of Kent, Ohio.

Known as Model 125-RP Hydrovane rotary skid, the new unit features a compact weatherproof control panel mounted on the curb end of the compressor. Located adjacent to clutch lever and air outlets, this permits easy one-man operation of the machine.

The Model 125-RP is 81 inches long, 34 inches wide, and 51 inches high; weight is 2,300 pounds. The unit is powered by a Hercules engine.



For further information write to the Davey Compressor Co., Dept. C&E, Franklin Ave., Kent, Ohio, or use the Request Card that is bound in at page 18 of this issue. Circle No. 80.

For more facts on insert, circle No. 312→

A total of 456 prestressed-concrete girders will be used to build the 4,940-foot Bridge No. T-4, the longest structure on the Illinois Toll Highway. Span length of each girder is 88 feet 10¾ inches, and each girder's weight is approximately 45 tons. Manufactured by the American-Marietta Co. at its Hodgkins, Ill., plant, the girders are delivered ready for installation. Illinois toll road engineers reportedly found that they could save an average of $20,000 on each of 200 bridges by using precast-concrete deck spans. For further information write to the **American-Marietta Co.**, Dept. C&E, 101 E. Ontario St., Chicago 11, Ill., or use the Request Card at page 18. Circle No. 86.

Offer lock-nut wrenches for rear-axle bearings

A new set of rear-axle-bearing lock-nut wrenches for servicing all Ford trucks is offered by the Owatonna Tool Co.

Six sizes on four wrenches make up the complete set to easily remove and replace the octagon or hexagon rear-axle-bearing lock nut on any Ford truck rear axle, the company states.

For further information write to the Owatonna Tool Co., Dept. C&E, 381 Cedar St., Owatonna, Minn., or use the Request Card at page 18. Circle No. 23.

The Simba's maximum operating height can be extended to over 100 feet. Automatic safety cams instantly lock the platform to the mast in the event of hoisting-cable failure.

Construction hoist lifts 1,000 pounds at 125 fpm

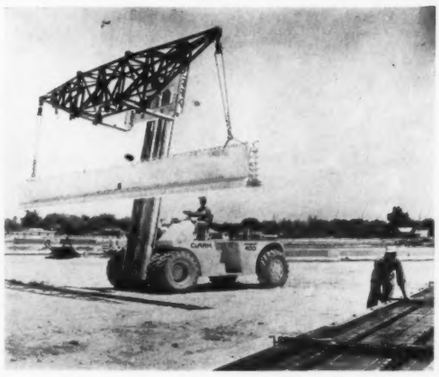
A construction hoist designated Simba, and featuring a load capacity of 1,000 pounds and a lifting speed of 125 fpm, is offered by the Tubular Structures Corp. of America.

A basic height of 22 feet permits unloading to 18 feet. Additional 5½ and 11-foot sections can be quickly added to extend the maximum operating height to over 100 feet. A concrete bucket is available and may be attached to the platform.

The Simba hoist is towed by car or truck to the job, and one man can set it up in just a few minutes. A Briggs & Stratton 8-hp air-cooled engine provides the power.

For further information write to the Tubular Structures Corp. of America, Dept. C&E, 2960 Marsh St., Los Angeles 39, Calif., or use the Request Card at page 18. Circle No. 10.

Damage to prestressed-concrete double-tee and channel slabs, caused when the members were stripped from permanent pouring forms, has been eliminated by use of a specially rigged fork truck at Dura-Stress, Inc., Leesburg, Fla. The company fixed its Clark Model CY-400, a 40,000-pound-capacity machine, with a removable boom attachment capable of carrying structural shapes 80 feet long. The boom itself is 36 feet long. Sleeves on the bottom receive the truck's forks. Adjustable slings hanging from each end of the boom lift the members through hook-eyes embedded in the concrete. Dura-Stress uses up to 100 cubic yards of concrete daily on the 11 beds, which range in length from 60 to 650 feet. For further information on this and other fork-lift trucks, write to the **Clark Equipment Co.,** Industrial Truck Division, Dept. C&E, Battle Creek, Mich., or use the Request Card at page 18. Circle No. 53.



This heavy-duty ripper for use with Case Terra-Trac 80 and 100-hp crawler tractors penetrates 20 inches of hard ground. A trunion-mounted hydraulic cylinder provides down-pressure, as well as high clearance when the ripper is not in use.

Offer heavy-duty ripper with removable teeth

A heavy-duty ripper for use with its TerraTrac Models 800 and 1000 crawler tractors is announced by the J. I. Case Co.

The new ripper digs to a depth of 20 inches. Removable hardened steel teeth are 1½ inches thick and have replaceable drive-on tips. Three teeth are standard, but extra slots are provided so that five can be used for lighter digging.

The ripper is raised and lowered by a large trunnion-mounted hydraulic cylinder controlled from the operator's seat.

For further information write to the J. I. Case Co., Dept. C&E, Racine, Wis., or use the Request Card at page 18. Circle No. 34.

Masonry drilling machine has water feed to bit

A mobile, high-speed, heavy-duty drilling machine said to drill clean, perfect holes 10 to 15 times faster through reinforced concrete and many other hard, brittle, nonmetallic materials, is announced by Diamond

To obtain further information on any of the products described in this section, circle the number given at the end of the item on the handy Request Card that is bound in at page 18 of this issue.

Core & Saw, Division of Portomag, Inc.

The new Di-Cor drilling machine is equipped with a 2½-hp electric drill motor and an integral water swivel which supplies water to the cutting face of a diamond drill to cool the bit and flush away cuttings. This water fitting may be connected to any supply line and, if running water is not readily available at the job location, the unit may be hooked up to a portable pressure water tank.

The machine is wheel-mounted, simple to operate, and can be swung through 360 degrees to drill in any position and at any angle.

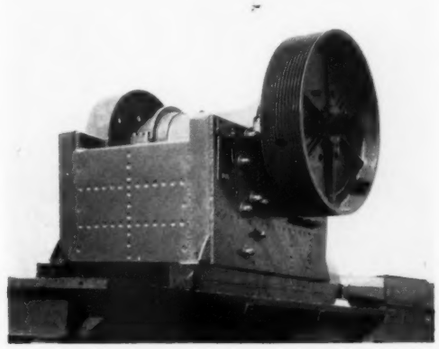
For further information write to Diamond Core & Saw, Division of Portomag, Inc., Dept. C&E, 1521 E. Nine Mile, Detroit 20, Mich., or circle No. 117 on the Request Card at page 18.

For more facts, circle No. 318→

Announce new jaw crusher in 20 x 36-inch class

A new jaw crusher in the 20×36-inch size is announced by Pioneer Engineering. The unit is the overhead eccentric type, on which the moving jaw is suspended from a shaft which also serves as the pitman. The manufacturer points out that this eliminates double toggles and extra shafts.

The crusher is hydraulically adjusted to produce materials down to 2½ or 3-inch minus, and has a rated capacity under average crushing of 190 to 200 tph of 6-inch-minus product. For 3-inch-minus product, its rated capacity is 95 to 100 tph under similar crushing conditions.



For further information write to Pioneer Engineering, Division of Poor & Co., Inc., Dept. C&E, 3200 Como Ave. S. E., Minneapolis 14, Minn., or use the Request Card at page 18. Circle No. 68.

For high production with tractor-drawn scrapers, the Shepherd Machinery Co. has produced this 45-yard-capacity earthmover by special modification of a Caterpillar No. 491 scraper. The modifications include extending the bowl 36 inches and the height of sides 4 inches with reinforcing throughout, giving a capacity of 35.7 yards struck and 45 yards heaped. For further information write to the **Shepherd Machinery Co.**, Dept. C&E, P. O. Box 6789, East Los Angeles 22, Calif., or use the Request Card at page 18. Circle No. 120.

Corrugated diamond saw increases cutting rate

A new diamond saw for concrete, cinder block, brick, and other ma-

sonry products, said to combine the hardness of a diamond blade and the cutting power of a tooth-edge saw, is offered by the Rock-Saw Corp.

The design adds 144 hitting points to the conventional 12-inch blade. It also increases the number of channels for sludge release and coolant circulation, according to the manufacturer.

For further information write to the Rock-Saw Corp., Dept. C&E, 135 Metropolitan Ave., Brooklyn 11, N. Y., or use the Request Card at page 18. Circle No. 118.

On the Dorsey Model MTT, Neway suspension with springs as well as walking beams equalizes the load on all three axles.

Offer low-bed trailer in capacities to 75 tons

The Model MTT three-axle low-bed trailer is available from Dorsey Trailers. Standard models range in capacities from 35 to 75 tons, with higher capacities available on special order.

The machinery hauler features Neway suspension with springs as well as walking beams to equalize the load on all three axles. It is offered in level deck and 6 or 9-inch drop design.

For further information write to Dorsey Trailers, Dept. C&E, Elba, Ala., or use the Request Card at page 18. Circle No. 2.

Tough new pick point for rippers, shovels

The RDX pick point for rippers and shovels, said to offer excellent

penetration and long life in such tough formations as hardpan and tight river-bottom gravel, is announced by the Electric Steel Foundry Co.

The unit's tapered wear pattern keeps the point exceptionally sharp due to its narrow ribbed design, the manufacturer claims.

For further information write to the Electric Steel Foundry Co., Dept. C&E, 2141 N. W. 25th Ave., Portland 10, Ore., or use the Request Card at page 18. Circle No. 82.

Lift block available with insulator link

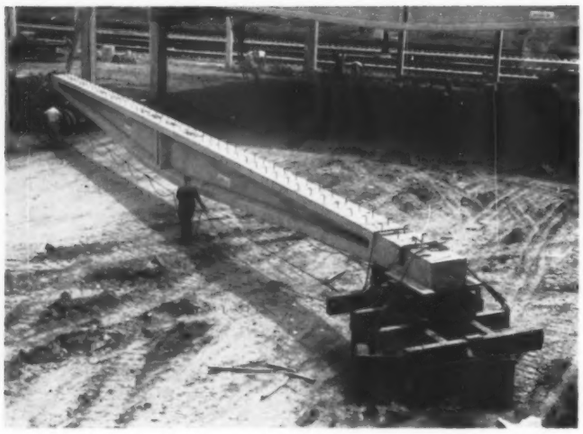
Miller Swivel Products, Inc., announces the availability of its high-lift block with insulator link assembled as one unit. The link may also be

furnished for installation on blocks already in use.

The insulator link is designed to provide protection for riggers against electrocution from accidental contact of crane booms with overhead energized wires. It is offered in capacities up to 35 tons.

For further information write to Miller Swivel Products, Inc., Dept. C&E, P. O. Box 938, Pomona, Calif., or use the Request Card at page 18. Circle No. 27.

For more facts, circle No. 322→



This 100-foot, 30-ton prestressed-concrete beam is being moved into position at the erection site of Cleveland's new Transit System terminal. The beam, supplied by George Rackle & Sons, of Cleveland, is being hauled by a Rogers Bros. telescopic pole trailer with the pole feature removed. The rear section of the trailer houses a separate motor and hydraulic pump which facilitates the turning of the complete wheel assembly. According to the manufacturer, the rear section is easily synchronized with the front tractor movement, permitting maximum maneuverability. For further information about this trailer, write to **Rogers Bros. Corp.** Dept. C&E, 108 Orchard St., Albion, Pa., or use the Request Card at page 18. Circle No. 122.

New 1 ½-yard shovel is versatile machine

The Manitowoc Engineering Corp. announces a new 1½-cubic-yard shovel. The Model 2300 is easily converted to a 1½-yard clamshell or trench hoe, a 1½ to 2½-yard dragline, or a 35-ton crane.

An important feature on this machine is the easy hydraulic jack adjustment of the crawler drive, said to assure even crawler tension at all times.

For further information write to the Manitowoc Engineering Corp., Dept. C&E, 16th and River Sts., Manitowoc, Wis., or use the Request Card at page 18. Circle No. 79.

The Model 2300 has only 11 gears in the upper deck machinery. A central lubricating point permits all major grease points to be reached at once.

The Anthony Twin Yard Bird, a dump body for 1-ton truck chassis, eliminates the need for partial loads on larger trucks.

Lightweight dump body has powerful twin hoist

The new Twin Yard Bird announced by the Anthony Co. is a lightweight dump body made especially for 1-ton truck chassis.

Constructed of 12-gage steel, the unit has an 8-ton lift capacity provided by a twin-head-lift high-pressure hoist. The hoist has a full subframe to take stresses and thus puts no strain on the truck frame. It is driven by power takeoff from the truck transmission.

Twin Yard Bird bodies are available in lengths of 8, 9, and 10 feet. All bodies are 78 inches wide. Both 3-cubic-yard and 4-cubic-yard capacities are available in each length.

For further information write to the Anthony Co., Dept. C&E, Streator, Ill., or use the Request Card that is bound in at page 18 of this issue. Circle No. 28.

Electric hammers, drills are self-contained units

Syntron's new 1½ and 2-inch-capacity electric hammers and 2-inch-capacity electric hammer drills are now completely self-contained, the company announces.

The cable plugs directly into the power line. Conversion of ac to dc—formerly performed by the separate controller—is now accomplished by an improved rectifying element inside the tool itself.

Both hammers and drills produce 3,600 blows per minute for cutting, chipping, and drilling in concrete, stone, brick, and other hard compositions.

For further information write to the Syntron Co., Dept. C&E, 227 Lexington Ave., Homer City, Pa., or use the Request Card at page 18. Circle No. 103.

All standard mountings are available for the Type WT, including crawler, self-propelled carrier, and truck.

30-ton truck crane has flexible design

A new 30-ton lorry crane is announced by the Insley Mfg. Corp.

Called the Type WT, the unit can be supplied with three different truck mountings to meet varying axle load requirements of the various states. The 30-ton truck carrier is 9 feet wide, and the 25-ton truck carrier is offered in both 8 and 9-foot widths.

The WT features an 8-foot-wide deck, with all operating machinery mounted low and well back of the center line of rotation. The basic boom length is 35 feet.

For further information write to the Insley Mfg. Corp., Dept. C&E, P. O. Box 167, Indianapolis 6, Ind., or use the Request Card that is bound in at page 18 of this issue. Circle No. 107.

Curb, trench backfiller has several improvements

A combination hopper-conveyor towed by the truck that charges it, the improved Power-Pack unit now permits discharge of material at a rate of 180 tph.

Improvements on its curb and trench backfiller are announced by the Power-Pack Conveyor Co. The machine is a combination hopper-conveyor towed by the truck that charges it.

A more powerful conveyor drive permits discharge of material at a rate of 180 tph.

Design improvements further simplify attaching the unit to trucks for operation or towing to other jobs, and assure greater accuracy and stability while discharging material.

Attachments for the improved machine permit filling of trenches up to 8 feet from the pavement, as well as the laying of hot-mix, etc., for road-widening and shoulder work.

For further information write to the Power-Pack Conveyor Co., Dept. C&E, 836 E. 140th St., Cleveland 10, Ohio, or use the Request Card at page 18. Circle No. 21.

A low center of gravity makes the 6-ton-capacity Totem-All an ideal machine for carrying all types of equipment. The unit is hitched to a light pickup truck.

New equipment hauler is pulled by pickup

A newly announced trailer for hauling light and medium-size construction machinery is available from the Birmingham Mfg. Co., Inc.

Called Totem-All, the unit is hitched to a light pickup truck for transporting small crawlers, tractors with front-end loaders, backhoes, scraper blades, trenchers, and other similar equipment.

Specifications include an over-all length of 19 feet, and a 12-foot 6-inch length of bed; over-all width of 96 inches, and a 78-inch loading width. The tandem unit has a 12,000-pound capacity, and the triple Totem-All has a capacity of 17,000 pounds.

For further information write to the Birmingham Mfg. Co., Inc., Dept. C&E, P. O. Box 1351, Birmingham, Ala., or use the Request Card at page 18. Circle No. 123.

Workman vibrates 1½-inch slump concrete for tongue beams with the Stow Model DU electric vibrator. Because of its small heads—1¼ or ⅞-inch—the Model DU is especially recommended for jobs with narrow forms, such as prestress work. The unit is offered with flexible shafts in lengths from 2 to 21 feet long. A 9-pound ¾-hp motor delivers 12,000 vibrations per minute; thermal overload protection is an added feature. For further information write to the **Stow Mfg. Co.**, Dept. C&E, 443 State St., Binghamton, N. Y., or use the Request Card at page 18. Circle No. 121.

A 40-foot boom for crane service is standard on this Model 30-B. For a longer boom, inserts up to 30 feet long are available.

Crawler-mounted crane is heavy-duty unit

A crawler-mounted Model 30-B heavy-duty crane, said to have greater lifting capacity than the standard Model 30-B crawler, is announced by the Bucyrus-Erie Co.

A 40-foot two-section boom is standard. Special boom-pin connection lugs are available as optional equipment for rapid change of boom lengths. Three boom-point sheaves are furnished. For a longer boom, 5, 10, 20, and 30-foot inserts are available.

Maximum load at 10-foot radius with a 40-foot boom is 35 tons.

Equipment for power-controlled lowering of load on the main hook is standard, as is pendant-type suspension with mast for all crane booms. Booms up to 100 feet long can be carried with boom point and mast lowered to cab height when special pendants are provided.

The main operating functions of the Model 30-B are air-controlled.

For further information write to the Bucyrus-Erie Co., Dept. C&E, The Doerman Bldg., 10th and Michigan Aves., South Milwaukee, Wis., or use the card at page 18. Circle No. 49.

Crown transitions easy with transverse finisher

A new transverse finisher, offering a single lever adjustment for crown transitions, is announced by the Koehring Co.

The one-man-operated unit has two hydraulically raised oscillating screeds. Slabs from 10 to 30 feet wide can be finished with standard adjustable widths as follows: 10 to 18 feet; 18 to 26 feet; and 22 to 30 feet. Three screed oscillation speeds—23.6, 34.2, and 56.4 strokes per minute—are provided. Screed stroke length is variable.

Traction speeds available during the finishing operation are 8, 11.8, and 19.5 fpm. An additional speed of 81.5 fpm is available when nonfinishing movement is necessary.

For further information write to the Koehring Co., Dept. C&E, 3026 W. Concordia Ave., Milwaukee 16, Wis., or use the Request Card that is bound in at page 18 of this issue. Circle No. 98.

The one-man-operated machine has two hydraulically raised oscillating screeds, and can finish slabs up to 30 feet wide. All controls are within easy reach of the operator.

The hydraulically operated Sky Boy Model 876 reportedly will pick up and load rocks up to 1,000 pounds in weight.

Heavy-duty rock picker unloads into dump trucks

The Bestland Sky Boy Model 876 rock picker is available from the Viel Mfg. Co.

This hydraulically operated unit features a 4,000-pound hopper-box capacity, and reportedly will unload easily into a dump truck. All operations are controlled from the tractor seat.

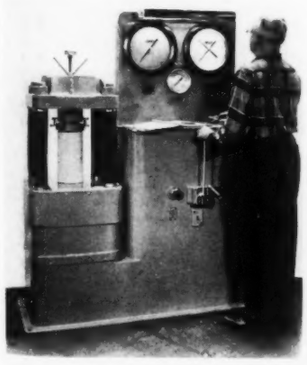
The spacing of the tines is adjustable, and the picker will handle both small and large rocks equally well. According to the manufacturer, it will pick up and load rocks up to 1,000 pounds in weight, depending on the shape.

For further information write to the Viel Mfg. Co., Dept. C&E, P. O. Box 632, Billings, Mont., or use the card at page 18. Circle No. 43.

Concrete-testing machine has 175-ton capacity

The Model LT-700, a machine for the routine testing of concrete and concrete products, is available from Forney's Inc.

The machine's capacity of 350,000 pounds with both high and low-pressure systems and variable loading speed makes possible a wide variety of uses in both compression and flexure. An assortment of standard accessories is available for testing cubes, cylinders, blocks, bricks, etc.



On the LT-700, an assortment of standard accessories is available for testing cubes, cylinders, blocks, bricks, beams, and lintels.

For further information write to Forney's Inc., Tester Division, Dept. C&E, Box 310, New Castle, Pa., or use the Request Card at page 18. Circle No. 51.

The trailer rises to approximately 30 degrees before the front wheels of the tandem suspension leave the ground.

Aluminum dump trailers feature frameless design

A full-frameless aluminum dump trailer has been added to the line of the Lodestar Corp. The trailer is available in models of 20 to 28-foot lengths with capacities of 16 to 31 cubic yards.

Weights of these trailers are approximately 4,000 pounds less than those of conventional steel trailers, according to the maufacturer.

For further information write to the Lodestar Corp., Dept. C&E, South Main, Niles, Ohio, or use the Request Card at page 18. Circle No. 78.

Earthwork calculations sped with electronic computer

Remington Rand announces that earthwork computation can now be done at electronic speeds with its Univac 120 computer.

According to the company, a few of the operations now possible are:

1. the conversion of cross-section plus and minus elevations to actual ground elevations at the rate of approximately 40 stations per minute;

2. the calculation of tangent elevation. vertical curve correction. grade elevation, and center line cut/fill, together with station and elevation equations, at the rate of approximately 9,000 stations per hour;

3. the computation of grade change at about 90 stations per minute.

For further information write to Remington Rand Univac, Division of Sperry Rand Corp., Dept. C&E, 315 Fourth Ave., New York 10, N. Y., or use the Request Card at page 18. Circle No. 7.

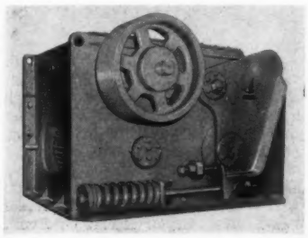
Fitted with a special gooseneck tongue which allows each drum to oscillate independently, and allows the roller to be attached to any of the larger 2 or 4-wheel rubber-tire tractors, the Ferguson-Gebhard tamper offers pressures up to 1,000 psi and 4,000 pounds per foot of drum length. With 2-wheel tractors, the roller will easily turn on a 20-foot width of fill. To provide complete oscillation of both drums, the gooseneck tongue revolves freely around the center pin of the roller and is held upright by two heavy cantilever springs. Side movement of the tongue is limited by heavy bumpers on each half of the roller. For further information write to the **Shovel Supply Co.**, Dept. C&E, P. O. Box 1369, Dallas 21, Texas, or use the Request Card at page 18. Circle No. 102.

New roll crusher offered in two sizes

The Eagle Crusher Co. announces two new roll crushers in sizes 24×20 and 30×24.

Made of manganese steel, the rolls are furnished either both smooth or both corrugated, or one of each.

Through heavy-duty tension springs, one roll is fixed and the other



floats, supplying ample crushing pressure yet relieving undue strain resulting from tramp iron and other foreign materials. Adjustment of the opening between the rolls (up to 3 inches) is accomplished by adjusting screws on either side.

For further information write to the Eagle Crusher Co., Dept. C&E, 124 N. Washington St., Galion, Ohio, or use the Request Card at page 18. Circle No. 108.

Device finds rock depth with no drilling required

A new instrument for locating rock without drilling is announced by the Geophysical Specialties Co.

Using sound waves in the earth, produced by an impact on the ground

surface, the Model MD-1 refraction seismograph reportedly permits determination of depth to bedrock with an accuracy of 5 to 10 per cent, or alternatively permits determining whether or not rock exists within any specified depth to 50 feet or more.

For further information write to the Geophysical Specialties Co., Dept. C&E, 4206 Longfellow Ave., Minneapolis, Minn., or use the Request Card at page 18. Circle No. 115.

Product LITERATURE

To obtain free copies of any of the literature described in the following section, circle the designated number on the Request Card at page 18.

A fact sheet describing the benefits of the Elgood dual four-point **tensioning and takeup system** for prestressed concrete. On-the-job photos illustrate the single-man, remote-control operation.

Write to the Elgood Equipment Corp., Dept. C&E, 380 Ten Eyck St., Brooklyn 6, N. Y., or use the Request Card at page 18. Circle No. 133.

Earth auger—a bulletin describing the Acker all-purpose unit for soil sampling, core drilling, and earth augering. Text and photos stress the versatility of the machine. Close-ups of major components; specifications. Data on auger bits.

Write to the Acker Drill Co., Inc., Dept. C&E, P. O. Box 830, Scranton, Pa., or use the Request Card at page 18. Circle No. 39.

Lightweight diesel engine—a brochure describing the Cerlist Model 3 diesel engine, a lightweight unit developing 85 horsepower at 3,000 rpm. Well illustrated with photographs, dimensional drawings, and performance curves.

Write to Cerlist Diesel, Inc., Dept. C&E, P. O. Box 1247, Burlington, N. C., or use the Request Card at page 18. Circle No. 138.

Portable pile hammer—literature describing the Vulcan Model DGH-100 portable differential-acting pile hammer that operates by compressed air or steam. The rig is described as small and light enough to be carried in a jeep or pick-up truck.

Write to the Vulcan Iron Works, Inc., Dept. C&E, 327 N. Bell Ave., or use the Request Card at page 18. Circle No. 139.

One-man vibratory compactor—a fact sheet describing the Wacker Vibro-Rammer Model GVR 100-C for use with a variety of materials including clay, earth, sand, silt, and bituminous base. Lists the many construction and operating features, and is illustrated with photographs. Specifications included.

Write to the Wacker Corp., Dept. C&E, Hartford, Wis., or use the Request Card at page 18. Circle No. 111.

Rock-salt stabilization—an illustrated booklet describing International Salt's simplified seven-step method of road improvement with rock salt. According to the company, this method of rock-salt stabilization is designed for small highway departments owning modest equipment.

Write to the International Salt Co., Dept. C&E, Spruce and Adams Sts., Scranton, Pa., or use the Request Card at page 18. Circle No. 75.

Cranes—a booklet describing Colby cranes and special equipment. Several models shown in on-the-job photos. Data on main components.

Write to Colby Steel & Mfg., Inc., Dept. C&E, 65 Horton St., Seattle 4, Wash., or use the Request Card at page 18. Circle No. 62.

A pamphlet describing the Simplex method of **single strand cable tensioning** for prestressing concrete. Lists the benefits of the method and includes illustrated description of a Simplex single strand prestressing jacking assembly. Form X340.

Write to Templeton, Kenly & Co., Dept. C&E, 16th and Gardner Road, Broadview, Ill., or use the Request Card at page 18. Circle No. 60.

Cutting torches—a folder describing Oxweld flame-cutting equipment, including torches that can be used interchangeably with every fuel gas combination. Covers manual and machine cutting equipment for use on every flame-cutting job from thinnest sheet metal to risers 10 feet thick. Form 1174.

Write to the Linde Co., Division of Union Carbide Corp., Dept. C&E, 30 E. 42nd St., New York 17, N. Y., or use the Request Card at page 18. Circle No. 76.

Tractor-dozers—a well illustrated catalog detailing the operating and construction characteristics of Michigan Models 180, 280, and 380 tractor-dozers. On-the-job photos; close-ups of major components; charts; sketches.

Write to the Clark Equipment Co., Construction Machinery Division, Dept. C&E, P. O. Box 599, Benton Harbor, Mich., or use the Request Card at page 18. Circle No. 101.

Scaffolds—a catalog on the Superior Scaffold Co.'s line of Auto-Lock tubular steel scaffolds. Includes dozens of "how to" tips for a wide variety of scaffold operations such as bracing for height; scaffolding flat, sloping, and curved ceilings; how to cut costs on exterior scaffolds; and shoring installations. Catalog CF-201.

Write to the Superior Scaffold Co., Dept. C&E, 5624 Bankfield Ave., Culver City, Calif., or use the Request Card at page 18. Circle No. 35.

A bulletin describing Leschen **high-strength stress-relieved strand** for prestressed concrete. Physical properties given for 3/8 and 7/16-inch strands. Illustrated with typical stress-strain curve charts (also available in enlarged size for wall mounting). Specifications included.

Write to the H. K. Porter Co., Inc., Leschen Wire Rope Division, Dept. C&E, 2727 Hamilton Ave., St. Louis 12, Mo., or use the Request Card at page 18. Circle No. 88.

Hardsurfacing electrodes—a hardsurfacing electrode catalog describing more than 25 different electrodes and wires from the A. O. Smith Corp. Contains a handy guide for selecting the correct electrode or wire to use on more than 400 different types of welding equipment. Bulletin MW-222.

Write to the Welding Products Division, A. O. Smith Corp., Dept. C&E, 3533 N. 27th St., Milwaukee, Wis., or use the Request Card at page 18. Circle No. 109.

A bulletin describing the properties, applications, and benefits of Stressrods—**high-tensile alloy steel bars for prestressed concrete.** Discusses end anchorages and couplings, rod jacking and grouting facilities, and post-tensioned design applications. Illustrated with drawings.

Write to Rods, Inc., Dept. C&E, 706 Folger Ave., Berkeley, Calif., or use the Request Card at page 18. Circle No. 128.

Bituminous plant—an illustrated folder detailing Pioneer's Auto-batch bituminous plant. Includes a full-page cutaway showing how the plant functions, with the flow of material clearly illustrated. Also shown in cutaway is the flow of material through the dryer and elevators. Complete specifications.

Write to Pioneer Engineering, Division of Poor & Co., Inc., Dept. C&E, 3200 Como Ave. S.E., Minneapolis 14, Minn., or use the Request Card at page 18. Circle No. 67.

Form oil—literature discussing the benefits of Conoco special form oil for use on both metal and wooden forms. Points out that the oil can be applied with a spray, swab, or mop.

Write to the Continental Oil Co., Dept. C&E, P. O. Box 2197, Houston 1, Texas, or use the Request Card at page 18. Circle No. 74.

Bulk-material handling—a 64-page catalog covering the Syntron line of vibratory bulk-material-handling equipment. Illustrations include many typical installations. Specifications. Catalog No. 586.

Write to the Syntron Co., Dept. C&E, 227 Lexington Ave., Homer City, Pa., or use the Request Card at page 18. Circle No. 14.

Portable truck scales—a bulletin describing American Eagle 20, 25, and 30-ton-capacity portable truck scales. Details the main features of these self-contained units, stressing both the standard full-capacity and the recording-type weigh beams. Photographs, specifications.

Write to the American Scale & Vise Co., Dept. C&E, 2745 Southwest Blvd., Kansas City 8, Mo., or use the Request Card at page 18. Circle No. 140.

Literature describing Joe Stine **mechanical equipment for prestressed concrete.** Data on pull rods, pull plates, split nuts, hydraulic power units, and hydraulic jacks. Specifications; prices.

Write to Joe Stine, Inc., Dept. C&E, 6022 Chocolate Bayou Road, Houston 21, Texas, or use the Request Card at page 18. Circle No. 47.

Aggregate production—a booklet describing various methods of preparation, beneficiation, and handling of aggregates. Illustrated with charts, working drawings, and photographs describing the use of Wemco equipment in the aggregate industry. Complete engineering data for 10 Wemco machines used in aggregate production. Bulletin G7-B25.

Write to the Wemco Products Division, Western Machinery Co., Dept. C&E, 650 Fifth St., San Francisco 7, Calif., or use the Request Card at page 18. Circle No. 40.

Air-blown mortar — a 42-page brochure describing the characteristics and benefits of Gunite, an air-blown mortar capable of developing very high strength. Text and photographs stress the wide variety of applications for the Gunite process. Well illustrated; general specifications included. Brochure G-55-57.

Write to the Gunite Contractors Association, Dept. C&E, 714 W. Olympic Blvd., Los Angeles 15, Calif., or use the Request Card at page 18. Circle No. 5.

Concrete-form hardware—a catalog covering the extensive Williams line of concrete-form hardware. Well illustrated with photographs, tables, sketches, and dimensional drawings. Indexed.

Write to the Williams Form Engineering Corp., Dept. C&E, 1501 Madison Ave. S. E., Grand Rapids 7, Mich., or use the Request Card at page 18. Circle No. 141.

Truck-mounted rotary drill—a fact sheet on the Portadrill Model 10TC, a heavy-duty truck-mounted rotary drill especially suited for blast-hole drilling in hard rock formations. Lists construction and operating characteristics of the machine, and is illustrated with photographs. General specifications.

Write to The Winter-Weiss Co., Dept. C&E, 2201 Blake St., Denver 5, Colo., or use the Request Card at page 18. Circle No. 16.

Versatile welder—a folder describing a combination ac, dc, and inert-gas Hobart welding machine. Discusses the advantages of having a welder that will do all three types of welding. Bulletin DM-71.

Write to Hobart Bros. Co., Dept. C&E, Troy, Ohio, or use the Request Card at page 18. Circle No. 142.

Electric generating plants—an illustrated folder discussing the factors to be considered in selecting an electric generating plant. Takes into account maximum use of electric power tools, size of work crew (listing minimum wattage requirements), portability, and weight. Gives specifications of basic Onan 500 to 10,000-watt air-cooled units. Folder F-123.

Write to D. W. Onan & Sons, Inc., Dept. C&E, 2515 University Ave. S. E., Minneapolis, Minn., or use the Request Card at page 18. Circle No. 97.

(Continued on next page)

Product Literature—*yours for the asking!*

Heavy-duty ripper — literature describing the Ateco Super HR72-D9 tractor-mounted pipeline ripper. Discusses the construction characteristics of the unit, and is illustrated with sketches and photographs. Specifications included.

Write to the American Tractor Equipment Corp., Dept. C&E, 9131 San Leandro St., Oakland, Calif., or use the Request Card at page 18. Circle No. 33.

Scaffolding—a case-history-type brochure on the benefits of Patent scaffolding. Text and on-the-job photographs cover the use and advantages of the firm's scaffolding on a variety of jobs.

Write to The Patent Scaffolding Co., Inc., Dept. C&E, 38-21 12th St., Long Island City 1, N. Y., or use the Request Card at page 18. Circle No. 112.

Mobile hydraulic hammer—a bulletin on the Arrow mobile hydraulic hammer. On-the-job photos show the unit cutting asphalt, breaking concrete, tamping backfill, and driving guardrail posts. Condensed specifications.

Write to the Arrow Mfg. Co., Dept. C&E, 194 W. Dakota St., Denver, Colo., or use the Request Card at page 18 Circle No. 15.

Hand winches—a bulletin on Beebe hand winches. Describes and illustrates several models ranging in capacities from 250 pounds to 15 tons. Data on accessories; specifications.

Write to Beebe Bros., Dept. C&E, 2724 Sixth Ave. S., Seattle 4, Wash., or use the Request Card at page 18. Circle No. 89.

Screed—an illustrated brochure describing the new Thor vibratory concrete finishing screed. Stresses the unit's double-beam construction with "strap-action" for strike-off and compacting to finish concrete slabs in one operation. Brochure JE-2346.

Write to the Thor Power Tool Co., Dept. C&E, Prudential Plaza, Chicago 1, Ill., or use the Request Card at page 18. Circle No. 37.

A folder describing the Prestressed Equipment Co.'s new system for the **single-strand tensioning of prestressed concrete.** Also contains data on strand releasing. Illustrated with drawings.

Write to the Prestressed Equipment Co., Dept. C&E, P. O. Box 1264, Lakeland, Fla., or use the Request Card at page 18. Circle No. 143.

Soils, concrete, asphalt testing—a 128-page catalog covering the complete line of Testlab equipment for engineering tests on soils, concrete, and asphalts. Illustrated with photos. Indexed for convenience. Price list included.

Write to the Testlab Corp., Dept. C&E, 250 W. 57th St., New York 19, N. Y., or use the Request Card at page 18 Circle No. 32.

Pipe tools—a catalog covering Spring Load pipe tools. Describes and illustrates several models of pipe cutters, gravity grip vises, and machining and tapering tools for asbestos-cement pipe. Price list included.

Write to the Spring Load Mfg. Corp., Dept. C&E, 6332 Maynard Ave., Seattle 8, Wash., or use the Request Card at page 18. Circle No. 63.

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Avoid legal pitfalls

Oral changes of contracts

THE PROBLEM: *A subcontract to paint and supply materials for construction undertaken by the general contractor specified: "Without invalidating this contract, the contractor may add to or reduce the work to be performed hereunder. No extra work or changes from plans and specifications under this contract will be recognized or paid for, unless agreed to in writing before the extra work is started or the changes made. The written order shall specify in detail the extra work or changes desired, the price to be paid, or the amount to be deducted should said change decrease the amount to be paid hereunder." The contractor's general superintendent required the subcontractor to do work not covered by the contract, but refused to sign a written work order, saying that it was not necessary. Could the subcontractor collect for the extras?*

THE ANSWER: Yes. (Wagner v. A. Graziano Construction Co., 136 Atl. 2d 82, decided by the Pennsylvania Supreme Court.)

The court reasoned that when a certain kind of contract is not required by law to be in writing, it may be modified orally by the parties. In short, a present agreement that any future agreement must be in writing does not tie their tongues.

Contract clause on attorney's fees

THE PROBLEM: *In Florida, as in many other states, a contract involving payment of money may provide for assessment of an attorney's fee to reimburse the obligee of the bond for expense incurred in having to sue to collect what the obligor owes. The payment bond given by the contractor on a county school job did not provide for assessment of an attorney's fee if the contractor failed to pay a materialman. Nor did the contract between the materialman and the contractor provide for such a fee. But the bond given by the contractor to the county school board did bind the surety for any default by the contractor under the prime contract. That contract, by reference to the bidding specifications, provided for payment of an attorney's fee in a suit by the school board on the bond.*

A materialman sued on the bond in the name of the board for a sum due from the contractor. Was the surety liable for an attorney's fee?

THE ANSWER: No. (Pan American Surety Co. v. Board of Public Instruction of Dade County, 99 So. 2d 890, decided by the Florida District Court of Appeal, Third District.)

The court said that the attorney's fee clause was for the benefit of the school board only, if it should have to sue the contractor for breach of the prime contract.

Edited by A. L. H. STREET
Attorney-at-Law

These brief extracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Trespassing child injured

THE PROBLEM: *The courts generally recognize that a contractor is liable for injuries to children trespassing on a construction site when work is not in progress, when there are no watchmen on the job, and when the particular accident could have been foreseen and no steps were taken to prevent it.*

Carpenters had left a piece trimmed from a composition shingle on an unfinished roof. A trespassing boy threw the shingle piece from the roof and it struck another youngster in the eye. Was the foreman of carpenters liable in damages for the injury?

THE ANSWER: No. (Massino v. Smaglick, 89 N. W. 2d 223, decided by

avoid legal pitfalls

the Wisconsin Supreme Court.)

The court reasoned that the object was not inherently dangerous and that, therefore, the accident was not foreseeable.

Negligent truck driving

THE PROBLEM: *A speeding dump truck working on a dam project came off a side road and made a right turn onto a paved highway without stopping and without warning. It cut onto the highway only a short distance ahead of an automobile. The automobile driver slammed on the brakes, and his car skidded across the wet pavement into the path of another automobile approaching from the opposite direction.*

Were the driver and the owner of the truck jointly liable for the damage done in the resulting collision of the two cars?

THE ANSWER: Yes. (Dufour v. Taranto, 100 So. 2d 304, decided by the Louisiana Court of Appeal, New Orleans.)

Right to payment accrued

THE PROBLEM: *Plaintiff agreed to fabricate skylights for the defendant subcontractor, and payments were to be made as requisitioned by the plaintiff. Plaintiff fabricated the skylights according to contract and delivered them to the subcontractor. Was plaintiff entitled to be paid the agreed price with interest from the respective dates when installments of payment were due, without waiting until the subcontractor received full payment from the general contractor?*

THE ANSWER: Yes. (E. Van Noorden Co. v. Hartford Roofing & Sheet Metal Co., 147 N. E. 2d 749, decided by the Supreme Judicial Court of Massachusetts.)

Workmen's compensation

THE PROBLEM: *Plaintiff's husband was killed while dismantling walls of a building which defendant had bought from a school district. The deceased, under contract to raze the building, was experienced in that work and had the necessary equipment for the job. He was also a contractor on other jobs, and used his own employees on this particular one. Did the Kansas Workmen's Compensation Law entitle plaintiff to benefits as widow?*

THE ANSWER: No. (Snedden v. Nichols, 317 Pac. 2d 448, decided by the Kansas Supreme Court.)

Deceased must be classified as an "independent contractor", and not as an employee of the defendant.

Owner liable on check

THE PROBLEM: *The owner issued a check to a contractor as final payment. The contractor endorsed it to a materialman. But the owner stopped payment before the check was cleared, claiming that work was defective. The materialman did not know that payment had been stopped nor that the owner claimed the work was defective. Was the owner liable to the materialman for the check?*

THE ANSWER: Yes. (Boston Post Lumber Co. v. Rubin, 169 N. Y. Supp. 2nd 939, decided by the New York Supreme Court, Bronx County.)

The court said that the materialman was not bound to ascertain whether or not the contractor had fulfilled his contract, even if the materialman had recommended him to the owner as being competent and reliable.

Delays not excused

THE PROBLEM: *A contract for work on a public building specified that the contractor should pay $22.50 for each day's delay in completion beyond 120 days. The contractor knew that needed materials might not be presently available. Could he later excuse delayed performance on the ground of unavailable materials?*

THE ANSWER: No. (Kelly v. Board of

Education of City of New York, 169 N. Y. Supp. 2d 405, decided by the New York Supreme Court, Special Term, Kings County.)

Excavation is "labor"

THE PROBLEM: *The prime contractor on a municipal housing job gave bond to pay "for all work done, or skill, tool, machinery, supplies, labor, and materials furnished". A subcontractor hired the owner of a ditching machine to excavate trenches on a linear footage charge basis. Did the bond cover the charges of the machine owner?*

THE ANSWER: Yes. (H. F. Vann Nieuwenhuyee & Sons Construction Co. v. Irby, 99 So. 2d 651, decided by the Mississippi Supreme Court.)

The court rejected the argument that the claim was for machine rental and not for labor, and that a person employed by the subcontractor to perform work was not within the coverage of the bond. The court could not see any distinction between a laborer digging a ditch at so much per linear foot with his own shovel and digging one with his own machine.

Federal tax lien versus mechanic's lien

THE PROBLEM: *The federal government filed notice of a tax lien against a contractor because of delinquent withholding and social security taxes. Later, a subcontractor filed a mechanic's lien against the property on which work had been done. Under federal law, was the tax lien superior to the mechanic's lien?*

THE ANSWER: Yes. (Aquilino v. United States, 146 N. E. 2d 774, decided by the New York Court of Appeals.)

The court said that even an earlier recorded mechanic's lien, not reduced to judgment, is subordinate to a later recorded federal tax lien.

Gravel pit contract

THE PROBLEM: *The owner of land, potentially valuable for residential use, sold sand and gravel in place for $190,000, payable over a term of 15 years. For the purposes of the seller's income tax liability, did the transaction constitute a sale of the sand and gravel, or a lease of the land for the purpose of removing the materials?*

THE ANSWER: A sale. (Barker v. Commissioner of Internal Revenue, 250 Fed. 2d 195, decided by the United States Court of Appeals, Second Circuit.)

The seller was therefore entitled to have the payments treated as long-term capital gains, as against the less favorable treatment of the payments as current income adopted by the federal income tax authorities.

Cashed check did not bar additional compensation

THE PROBLEM: *During a dispute concerning a contractor's right to additional compensation, the contractor wrote the owner that he would not accept, as final settlement, a check for the amount which the owner conceded to be due. The owner later sent a check for the amount, with the notation: "balance due contract". Did that bar the contractor from suing for more?*

THE ANSWER: No. (Earl T. Browder, Inc., v. County Court, Webster County, W. Va., 102 So. 2d 425, decided by the West Virginia Supreme Court of Appeals.)

Gravel hauler is employee

THE PROBLEM: *A gravel company engaged a truck owner to haul gravel. Either party could terminate the arrangement at will, and the gravel company had the right to control the operation of the truck, which it did. The hauling service was paid every 14 days on a yardage-and-distance basis. The company controlled loading operations, using its own machinery and fixing the time of loading. For workmen's compensation purposes, was the truck owner an employee of the company and not an independent contractor?*

THE ANSWER: Yes. (Wade v. Traxler Gravel Co., 100 So. 2d 103, decided by the Mississippi Supreme Court.)

License taxes

THE PROBLEM: *A company manufactured creosoted piling, lumber, and poles which were sold principally on competitive bids to contractors, governmental agencies, etc. Wholesale sales were negligible. Was the company exempt from statutory license imposed upon "retail dealers", on a theory that an exemption of "manufacturers" applied?*

THE ANSWER: No. (American Creosote Works, Inc., v. Collector of Revenue of Louisiana, 101 So. 2d 245, decided by the Louisiana Court of Appeals, New Orleans.)

Management

Planning and production:
Work simplification

by **GEORGE E. DEATHERAGE, P. E.**
construction consultant

This is the thirty-fourth of a series of articles on Construction Management by George E. Deatherage, P. E., construction consultant. The articles are based on an eight-volume "Manual of Advanced Construction Management" published by Geo. E. Deatherage & Son, Satsuma, Fla. The manual is used in a training course for superintendents and project managers, and is directed primarily at those contractor employees who have reached the foreman level or its equivalent, and who need practical help in order to take complete charge of construction projects themselves.

Simple process charts record and analyze the activities or movements of workmen or materials. Individual motions made by the workmen to accomplish a certain task can also be broken down and studied. This is a motion study, and it is useful in finding out if a man is doing his job efficiently.

It is possible, for instance, to chart or clock a bricklayer to see if he is using the fewest possible motions to lay the greatest number of bricks. Timing each of the bricklayer's motions with a stop watch, in order to cut the time and step up production, is termed a time study. A combination of the two operations is a time and motion study—a study of all the motions gone through by an individual workman to perform a task which is being done time after time during the shift.

The object of a time and motion study is to measure what is being done and what can be done on a job, and to establish and measure what is possible for the workman to do when he is trained in the most efficient work methods. The time and motion study covers the workman using his hand tools, or aided by machines, and the techniques to secure maximum production from both types of work.

Motion analysis

Most manual work is done with two hands, and a few fundamental motions are repeated time and again. However, this does not mean that an equal number of motions, or an equal amount of work, is done by both hands. One hand may be idle, holding the work in place, while the other hand is engaged in active work.

A bricklayer usually holds the brick in his left hand while he applies the mortar from the trowel with his right hand. Momentarily, the left hand is idle. After laying the brick in place, he taps it down with the trowel, and the left hand again is idle.

The ideal situation is to establish the number of useful motions and divide the work equally for two hands so that idle motions are eliminated. This should result in a minimum amount of time needed for the work cycle.

It is an easy matter to get to know the fundamental motions for almost all work. For example, in bricklaying the sequence of motion for the left hand is "transport empty" (reach for the brick); "grasp" (take hold of the brick); "transport loaded" (carry the brick to the wall); "position" (turn brick in proper position to butter);

"hold" (hold in position); "transport loaded" (carry brick to the bed); "pre-position" (place directly over position spot); "release load" (let go of the brick).

The right hand would be idle part of the time, assuming that the bricklayer held on to his trowel. It would come into play only after the left hand had made four motions, reaching the point where the mason was ready to butter the brick. He might, at this point, have already put mortar on the trowel or, if not, he would have to reach over the mortar box for the mortar and transport it back to where the left hand was positioning the brick for buttering.

Analysis sheet

Because it is nearly impossible to describe the simultaneous movements of both hands, the analysis sheet, Figure 1, is used to record and time right and left-hand movements. The time readings are made with a split-second stop watch. Both the analysis sheet and stop watch can be fastened to a clip board, so that the watch can be easily manipulated and the operator can use both hands for writing. In many cases, a slow-motion movie is made of the operation, and the data is posted on the analysis sheet.

In posting the movements, the operator should first set down movements as they occur, without timing them. Once this has been done for both hands, and checked through several work cycles, the movements are timed. The clock readings are posted first, and then the time consumed is calculated and set down.

The symbols and a short description of the most commonly used hand motions, Figure 2, are from the textbook "Work Methods Manual," by Ralph M. Barnes. Priced at $3.50, the book may be purchased from John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y.

The starred symbols refer to separate physical fundamental motions, and are the only ones used to chart motion or work. The others are descriptive of those motions which further detail what is happening.

Work simplification

Analysis sheets and symbols for a time study are the basis for a study of work simplification that is aimed at finding the cheapest and fastest way a job can be performed. There are ten basic principles of motion economy which form a code for studying work simplification. These principles are the basis upon which other factors are built or associated. Anyone familiar with their use and application can do much to reduce costs and, in some cases, to cut them in half or more.

The first principle is that motions of two hands should be simultaneous and symmetrical. Symmetrical motion means that both arms swing out or in from the body in somewhat similar manner, the motions balancing each other. When the left hand reaches up to get something or to do something, while the right hand pulls an object toward one, the motions are not symmetrical. They are unbalanced motions that put a strain on the workman, causing undue fatigue and jar on the body.

Contrasted to this is motion in which both hands swing outward simultaneously in a half circle in order to pick up something or do work. Here is a harmonious balance of the body members, more work being done with less effort. More and faster work can be done if both hands work together, beginning and completing a motion at the same time.

It is advantageous to provide similar work on the right and left-hand sides of the work place, enabling both hands to move together in performing the same motions. The greatest advances in the use of these methods occur in bench work, where the tools and materials can always be located

(Continued on next page)

Geo. L. Dunbrooge & Son
ANALYSIS SHEET

SHEET NO 1 OF 1 — CHART NO S-14

OPERATION Group Housing — DATE 8/2/32 OPER NO 21
MACHINE None — MACH NO — ANALYSIS BY R. G. D.
OPERATION DETAIL Laying 21-inch face, select mark floor over pine sub-floor. Bundled flooring delivered to work place by helpers, and bundles broken open. — OPER NAME A. Simmons — UNIT S. F. — RATE 52.30 — CONT NO 1789 — COST CODE 18

L.H. SYMBOL CODE	L.H. SYMBOL EMIT	L.H. SYMBOLS	LEFT HAND DESCRIPTION	R.H. SYMBOL CODE	R.H. SYMBOL EMIT	R.H. SYMBOLS	RIGHT HAND DESCRIPTION
		(P'	Carpenter to kneeling position on floor)			(Tools at hand)	
		P'	Bends body over			TK	Reaches for hammer
		U	Hand supports body			G	Grasps hammer
						TL	Hammer to front position
		St	Selects flooring				
		TE					

Figure 1.

Select	St	Select object
Grasp*	G	Grasp object
Transport loaded*	TL	Move object
Position*	P	Position for assembly
Assemble	A	Assemble parts
Use*	U	Use of tool
Disassemble	DA	Separating units
Inspect	I	Test unit
Pre-position*	PP	Position unit for grasping
Release load*	RL	Let go of object
Transport empty	TE	Move hand to unit
Rest	R	Worker rests
Unavoidable delay	UD	Delay beyond control of worker
Avoidable delay	AD	Worker responsible for delay
Plan	PN	How to proceed with work
Hold*	H	Hold unit

Figure 2.

(*Continued from preceding page*)

in the same place. However, there are also many places where the system can be applied to mobile jobs—laying finish floors, erecting wall board, and fitting locks—to create a standard method of the highest efficiency.

The second principle is to have tools and materials located close by and directly in front of the workman, in order to be within easy reach of his hands. Transport distances should be as short as possible, and movements should be as few as possible.

A person works in areas which are arcs of circles. In the horizontal plane there is a definite area in which the worker gets the greatest production with the least effort. This area is an arc drawn with a sweep of the hand across the bench or work place. The areas in which the bench workman gets the greatest production are determined by extending the forearm, the upper arm hanging at the side of the body until it tends to swing away as the hands move forward to the outer part of the work place.

The maximum working area is determined by the sweep of the arm across the work place, with the arm pivoted at the shoulder. The overlapping arc constitutes a zone in which two-handed work may be done most conveniently.

This data can also be applied to non-bench operations. A bricklayer working on a swing scaffold has limited work space. The mortar box and brick storage must be within easy reach to permit the simultaneous use of both hands to make greater production possible.

On the horizontal scale, the bricklayer should confine his work space, for the greatest efficiency, to a 59-inch length of wall, the adjacent workmen picking up at those limits. In order to work to the best advantage, the bricklayers should be spaced along the wall at distances not much greater than five feet.

Similar space limitations regulate working distances in the vertical plane, since there is a maximum distance beyond which work cannot be done without disturbing the natural body balance and posture. If these basic position limitations are given full consideration when providing scaffolds and work platforms on all outside work, the result is bound to be beneficial productionwise.

Other principles

The remaining eight principles of motion economy are self-explanatory. There should be a definite fixed place for all tools and materials so that the worker can grasp them when needed, automatically and without mental direction.

Gravity feed bins and containers should be used to deliver materials

Man	Machine
1. Pick up piece, place in a jig, clamp, lower drill and throw in feed. (GET READY)	IDLE
IDLE	2. Drill ½" hole in piece. Time 2.5 minutes. (DO)
3. Raise drill, remove piece, dispose, Blow chips out of jig. Time 3/4 minute. (CLEANUP OR PUT AWAY)	IDLE.

Figure 3.

	Man	Machine
Idle Time	2.50 minutes.	1.25 minutes.
Working Time	1.25 minutes.	2.50 minutes.
Total Cycle Time	3.75 minutes.	3.75 minutes.
Utilization in percent.	Operator Utilization $\frac{1.25}{3.75}$=33%	Machine Utilization $\frac{2.50}{3.75}$=67%

Geo. E. Dunbrage & Son
MAN AND MACHINE CHART

DATE 8/10/53 CHART NO S 19
SUBJECT Load earth from embankment LOCATION Baltimore
CONT NO 1790 CODE 4 CHARTED BY S. G. D. MACHINE NO S-167 RATE $15.
OPERATOR Chas. Jones RATE $2.75 HELPER/Truck ½ yards RATE $3.50
MACH. DESCRIPTION Koehring Model F on crawlers CAP 3/4
OPERATION Load up embankment, 3 yard dumps. 5-foot face. 180-degree swing
OLD METHOD X NEW METHOD PROPOSED UNIT C.Y. PART COST

* OPERATOR	TIME	TRUCK	TIME	MACHINE	TIME
Run machine	1.5	Idle Truck moves out	1.5	Load truck	1.5
Idle	2.5	Empty truck moves in	2.5		2.5
Run machine	3.0	Idle Truck moves out	3.0 1.0	Load truck	3.0
Run machine	3.5	Empty truck moves in	2.5	Move ahead in cut	3.5
Run machine	1.5	Idle Truck moves out Empty truck moves in	1.5	Load truck	1.5

Figure 4.

close to the point of use.

Tools and materials should be prepositioned wherever possible.

Drop deliveries—delivery of finished units by gravity to their destination—should be used wherever possible.

Hands should be relieved of all work that can be done advantageously by the feet. Foot-operated drill presses, soldering irons, bench vises should be used to release the hands for productive work.

Power-operated tools and equipment should be used wherever economical, and tools and materials should be located to permit the best sequence of motions.

Smooth continuous motions of the hands are preferable to zigzag motions or straight-line motions involving sharp changes in direction.

The height of the work place should preferably be arranged to permit alternate sitting and standing at work. Adequate lighting should be provided and the workman made as comfortable as possible.

Men, machine charts

Work simplification through the use of process charts, gang process charts, and time and motion studies can be applied to both men and machines, particularly where the operator and the machine work intermittently. The operator works while the machine is being loaded and sometimes when the load or finished product is being removed; the operator is idle while the machine is working.

A hoist tower, for instance, is idle while being loaded and unloaded, and the loaders and unloaders are idle when the hoist is going up and down. It is vital that idle time for the man or men be eliminated, and that the working time for the machine be at the maximum.

The way to improve operations is first to record and make an analysis of when man and machine work, and what each does. By doing so we can discover who is at fault—man, machine, or both. If the man is at fault, a time and motion study discovers the reason and points to corrective steps. A man and machine chart shows the deficiencies of both.

Man and machine operations con-

(*Continued on next page*)

Construction camera

Dirt moving on the first interstate project in Mississippi gets started with Euclid TS-24 twin-power scrapers making hauls. An Allis-Chalmers HD-21 is helping to push-load one of the rigs. Altogether, there are six of these scrapers on the U. S. 51 project near the Tennessee state line.

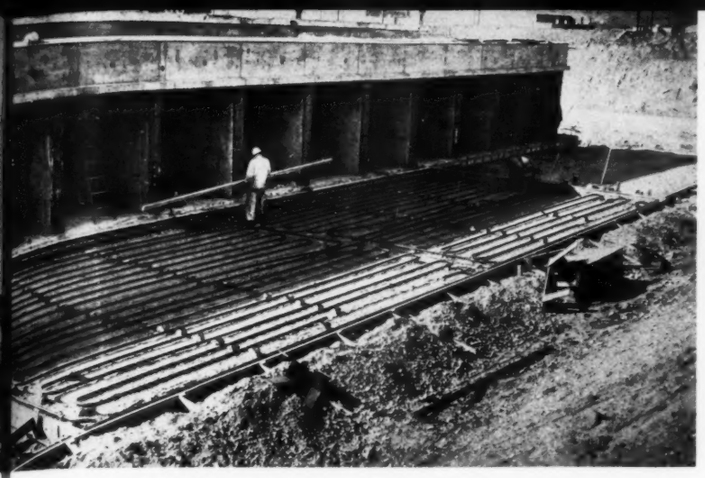
Structural steel is set by an American crane for the new million-dollar headquarters of the Gibraltar Savings and Loan Association in Beverly Hills, Calif. McNeil Construction Co., Los Angeles, is the contractor for the 48,000-square-foot building.

(Continued from preceding page)

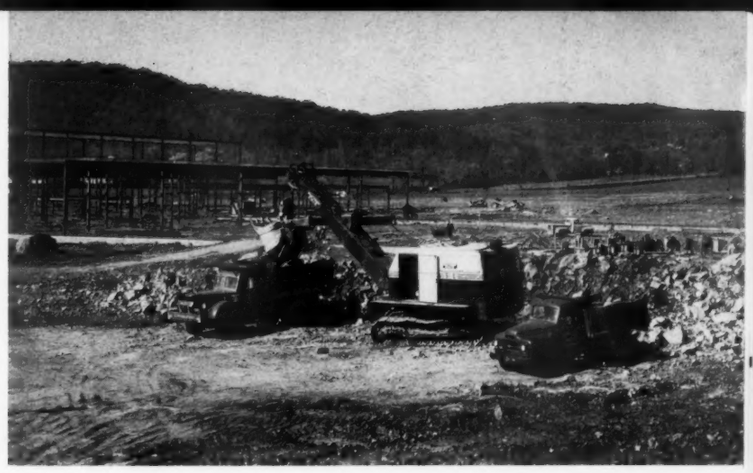
sist of three main steps: getting ready, such as putting sand, cement, and stone in a paver; doing the work, such as mixing the materials to make concrete; and putting away, or discharging the concrete from the drum.

Usually, a clearer picture of the relationship among these steps can be obtained from a chart, Figure 3. In this case, man and machine required 3.75 minutes to drill a hole in a casting. During this time the operator worked 1¼ minutes and the machine was in operation 2½ minutes. The operator's working time covered 33 per cent of the cycle, and the machine's working time accounted for 67 per cent of the cycle. A way to improve production here is to use two drill presses, the operator making the setup on the second machine while the first is drilling the hole.

A more detailed man and machine chart, Figure 4, contains the



In the new state of Alaska, where the emphasis is on defense construction, an ammunitions dump is being rushed to completion for the Air Force. The wrought-iron snow-melting system, supplied by A. M. Byers, will be encased in the concrete apron at the front of the structure.



More industries moving to the suburbs means more industrial construction. At this new factory site at Hackettstown, N. J., where 27,000 cubic yards of blasted rock and earth has to be removed, the loading-out operation is done by a Bucyrus-Erie 51-B. The P. T. & L. Construction Co., Inc., Paramus, is handling the job.

fundamentals of the previous example, but the makeup of the chart has been enlarged to include more data. A third factor has been added, a helper or truck. This enables one to chart the work of a shovel operator, shovel, and truck serving a shovel.

Additional columns should be added to take care of additional machines, operators, and helpers. Although this chart shows the time in minutes, it could be changed to seconds, if necessary.

Shovel analysis

This example, Figure 4, is a record of a power shovel loading out 3-yard trucks from an embankment with a maximum 5-foot face. The operator and machine activities have been plotted for 33 minutes. During the period checked, the operator was working 77 per cent of the time; the trucks, 33 per cent; and the shovel, 47 per cent.

The major causes for this low shovel production were delays in transportation, checking grade, and adjusting the main clutch. Over the period of the full shift, these delays might be minimized by spreading them over a longer period until the shovel efficiency increased to 75 or 80 per cent.

Analyzing motions

A detailed analysis of Figure 4 shows that the loading time varies from 1.5 to 3.5 minutes—an average of 2.5 minutes. The total digging cycle for one dipper load should not exceed 7 seconds in this earth, and the swing and return should not exceed 12 seconds. This provides a total of 19 seconds for the complete cycle. With five dipper loads per 3-yard truck, the total should be 95 seconds, or 1.5 minutes.

The loading time as charted is much too slow, and time is being lost. A time and motion study will develop the reasons for this.

The chart records that it takes from 1 to 2½ minutes for trucks to move in

(Continued on next page)

Construction camera

One of the last phases of work on the relocation of U. S. 16 in Clinton and Ionia counties, Michigan, is the sawing of longitudinal joints. The Canonie Construction Co., South Haven, Mich., subcontractor on the sawing work, uses an Eveready Model E-36 saw to cut the green concrete.

Backfill is unloaded by a Model HU Payloader during work on a new building for Harbison-Walker Refactories Co. at Portsmouth, Ohio. The Payloader is also being used to move material and transport ready-mix concrete for the contractor, Consolidated Construction Co., Inc., Baltimore.

(*Continued from preceding page*)

and out under the dipper. This is too slow and must be speeded up. A loss of 5 minutes in checking the grade is not justified. The foreman or other supervisor should see to it that the grade is checked without losing time.

A 2-minute loss of time because trucks are not available is too much. A 5-minute loss for machine repairs requires immediate attention.

This example shows how the man and machine charts can be employed to check the productivity and efficiency of any man-machine operation, such as mixing concrete, or pile driving.

Recording distances

The standard man and machine chart can be altered easily to record the distances a machine moves with its load. The activities of the operator and the machine—treating a tractor and scraper, for instance, as one unit —are noted in a man and mobile machine chart. There is space to record the distance the machine moves; space for recording the nature of the ground and the grade; and other data necessary to properly evaluate production. Also noted is the nature of the material, since this will regulate the time taken in loading.

Several sheets are needed to record a full shift operation, with the summary on the last sheet only.

With a man and mobile machine chart, it is possible to summarize the analysis in a cost per cubic yard. Operations should be checked over several full shifts before reaching any conclusions.

(*Next month's article will deal with "Planning and production: Factors affecting earth-moving production."*)

The Arizona Highway Department will build 43.5 miles of Highway 80, between Tucson and Benson, bringing it up to Interstate standards. Work will be completed in the 1963 construction season.

Work on the Mississippi River Bridge between New Orleans and Algiers, La., progresses swiftly as 26 × 7½-foot deck sections are set by an Austin-Western hydraulic crane. About 126,000 square feet of steel decking, fabricated by the Equipment Division of Blaw-Knox, is being used.

Another dump by an International 75 Payscraper adds to the amount of fill being placed at the site of a new sewage treatment plant for Odgen, Utah. Located ten miles west of the city, the job requires 500,000 cubic yards of borrow material as fill at the new plant site.

CIMA increases services to member companies

The board of directors of the Construction Industry Manufacturers Association has approved increased services to its member companies. This makes possible the formation of bureaus within the association framework, wherein member companies who manufacture similar equipment may join together as product groups. They may then formulate programs to promote the use of their products, discuss mutual problems, report business statistics, etc.

The numerous council activities under CIMA sponsorship will not be changed. Councils differ from the bureaus in that they embrace all members of the association, regardless of the type of equipment they manufacture, and are concerned with over-all industry problems, rather than with those of individual products.

Distributor doings

Johnson appoints dealer

C. S. Johnson Co., Champaign, Ill., subsidiary of Koehring Co., has appointed Wilson Equipment & Supply Co., Cheyenne, Wyo., a distributor for that state. Wilson Equipment will carry one, two, and three-stop automatic concrete batch plants for airport and highway paving; concentric batchers; transit-mix plants; elevating chargers; batch recording systems; portable batch plants on wheels; and clamshell buckets.

Hoffman Brothers awards drill-bits franchise

Law Engineering Testing Co., Atlanta, Ga., has been appointed Southeastern distributor for oriented diamond drill bits manufactured by Hoffman Brothers Drilling Co., Punxsatawney, Pa. The new technique of "orientation" of diamonds is said to extend the life of a drill bit by reducing diamond breakage.

P&H appoints new dealers

Drott Tractor Co., Inc., Milwaukee, has been appointed to represent the full line of P&H power cranes and shovels manufactured by Harnischfeger Corp., also of Milwaukee. P&H sales, service, and parts will be provided by Drott in its home office and in its branches at Madison and Rice Lake, Wis., and Iron River, Mich.

Calavar Corp., 2700 S Broadway, Los Angeles, Calif., has been appointed a distributor for the P&H diesel engine division in Southern California and western Arizona.

LeT-WesCo dealer makes personnel changes

Construction Service Equipment Co., of Omaha and North Platte, Nebr., has named Robert R. King as president and general manager to succeed James L. Paxton, Jr. At the same time, E. B. Christensen has been appointed vice president; and the duties of assistant secretary-treasurer William H. Tute now include those of assistant general manager.

The dealer is a distributor of earthmoving, hauling, and grading equipment manufactured by the LeTourneau-Westinghouse Co., Peoria, Ill.

Warner & Swasey appoints 23 new distributors

The Warner & Swasey Co., Cleveland, Ohio, has appointed 23 new distributors to handle the Gradall and Hopto lines of earthmoving machinery. The dealers are Aring Equipment Co., Inc., Milwaukee, Middleton, and Eau Claire, Wis.; M. L. Baxter, Ltd., Toronto, Ontario, Canada; Conte Equipment Corp., Pittsburgh, Pa.; Columbia Equipment Co., Portland, Ore., and Seattle and Spokane, Wash.; Equipment, Inc., Jackson, Miss.; J. C. Georg Construction Equipment, Inc., Syracuse, Schenectady, and Lisbon, N. Y.; Girard Machinery & Supply Co., San Antonio, Texas; Hedge & Mattheis Co., Boston, Auburn, and West Springfield, Mass., East Providence, R. I., West Haven and East Hartford, Conn., and Burlington and Rutland, Vt.; and Hi-Way Equipment Co., Inc., Houston, Texas.

Also included are Hi-Way Machinery Co., Dallas, Texas; Korte Bros., Inc., Fort Wayne and South Bend, Ind.; E. H. Kliebenstein Co., Ridgefield, N. J.; and John C. Louis, Co., Inc., Baltimore, Md., and Washington, D. C.; Marks Tractor & Equipment Co., Cleveland, Canton, Maumee, and Youngstown, Ohio; The Rayall Co., North Miami, Fla.; Road Machinery & Supplies Co., Minneapolis and Duluth, Minn.; Service Supply Corp., Philadelphia and Lancaster, Pa.; Telford Equipment Co. of Detroit, Inc., Detroit, Mich.; White Star Machinery & Supply Co., Wichita, Kans.; Western Construction Equipment Co., Billings and Great Falls, Mont.; West Virginia Mine Supply Co., Clarksburg, W. Va.; Liberty Trucks & Parts Co., Denver, Colo.; and Power Equipment Co., Knoxville, Nashville, Kingsport, and Chattanooga, Tenn.

Howell Tractor moves to new Illinois offices

A new building in Centex Industrial Park, Elk Grove, Ill., is now the headquarters of Howell Tractor & Equipment Co. The site covers an area of 170,000 square feet, with enclosed space of 25,560 square feet and 9,240 square feet of concrete apron area for shipping space and outdoor work room in good weather. Service and repair departments will use 10,560 feet of the enclosed portion.

Formerly located at 7443 Racine

Ave., Chicago, Howell Tractor is the midwest regional distributor for International Harvester, Drott, and Galion. The firm has branches at Rockford, Ill., and Gary, Ind.

Two new Trojan dealers

The Trojan Division of Yale & Towne Mfg. Co. at Batavia, N. Y., has appointed two new distributors for its Trojan tractor-shovel line. Pelican Machinery Co., Inc., 7300 Washington Ave., New Orleans, will cover the lower part of Louisiana; and W. F. Fuller Machinery Co., Ltd., 7th Ave. and Halifax St., Regina, Saskatchewan, Canada, will serve the entire province of Saskatchewan.

Oregon dealership formed

C. J. Guthrie has established the Guthrie Machinery Co., 5816 N. E. Lombard, Portland, Ore., to handle the low-volume lines of equipment throughout the Northwest. The dealer carries Clary strikeoff screeds, Petroleum Heating electric heat for storage tanks, Concut concrete saws, Murphy welded steel truck scales, and Calweld magnesium rakes and lutes.

Changes in Canadian firm

J. P. Frost, founder of the 26-year-old firm of Frost Machinery Co. Ltd., Winnipeg, Manitoba, Canada, has retired from active business and has named his son, Douglas P. Frost, president and general manager of the company. R. A. W. Vidler has been appointed vice president in charge of sales and office management.

New Prime-Mover dealers

The Prime-Mover Co., Muscatine, Iowa, has appointed three new distributors for its lines of powered carts and fork-lift trucks for handling concrete, masonry materials, and building supplies. E. L. Lester & Co., 5050 Holmes Road, Houston, Texas, is the exclusive distributor for that city and 32 surrounding counties.

The San Antonio and Corpus Christi, Texas, areas will be covered by Girard Machinery & Supply Co., 3402 Roosevelt Ave., San Antonio. Colorado will be served by King & East Machinery Corp., 2050 Bryant St., Denver.

Georgia dealer for Euclid

Brooks Machinery, Inc., Marietta, Ga., has been appointed a dealer for the complete line of scrapers, rear and bottom-dump haulers, and crawler tractors manufactured by the Euclid Division, General Motors Corp., Cleveland. Brooks Machinery, which will cover northern Georgia, has represented Euclid in another area for several years, but has relinquished that territory.

Illinois dealer for B-L-H

Werckle Construction Equipment Co., Route 51 and 11th Street Road, Rockford, Ill., has been appointed a distributor for Lima Austin-Western crushing, screening, and washing equipment made by the Baldwin-Lima-Hamilton Corp., Construction Equipment Division, Lima, Ohio, to cover the northwestern part of the state.

INDEX TO ADVERTISERS

Gottshall re-elected president of Atlas Powder

Ralph K. Gottshall has been re-elected president and elected chairman of the board of Atlas Powder Co., Wilmington, Del. As chairman of the board, Gottshall succeeds Isaac Fogg, who retired but will remain a director, a member of the finance committee, and chairman of the committee on audit.

At the same time, senior vice president Edward J. Goett was elected executive vice president; Edward J. Massaglia, vice president and general manager of the newly consolidated chemicals division; Robert J. Reilly, treasurer and secretary; and John H. Leary, assistant treasurer and assistant secretary.

Mobile testing lab tours entire nation

A completely equipped mobile trailer laboratory—designed, built, and equipped by Soiltest, Inc., Chicago—is making a tour of the United States. The laboratory makes possible engineering testing of building sites and road foundations, as well as quality control of building materials such as cement, concrete, and asphalt, on the job site. It contains 135 pieces of equipment, and some 30 separate tests can be performed on soils, concrete, cement, and asphalt.

The laboratory, after appearances on the West Coast, is moving east to Phoenix, Albuquerque, Fort Worth, Dallas, Oklahoma City, Kansas City, St. Louis, and back to Chicago for local visits in Illinois and Indiana. It will then proceed to the East where it will be exhibited at various engineering schools and government installations. It will be in New York City during the annual meeting of the American Society of Civil Engineers in October.

General Tire news

Fred L. Gulledge has been promoted to southeastern manager of special-purpose tire sales for The General Tire & Rubber Co., Akron, Ohio. A former Baton Rouge territory salesman, Gulledge replaces Roy Simpson, who is now national manager of off-the-road tire sales. Gulledge will make his headquarters in the Atlanta division offices.

At the same time, Richard E. Gardner has been appointed West Coast division manager of building materials, with headquarters in Los Angeles.

Gordon R. Lichtwardt, former Charlotte territory salesman, is now manager of passenger tire sales for the same territory. Dave Smukler is the new manager of truck tire sales for the Los Angeles division. He replaces Art Harris, who has been transferred to the firm's defense products division.

Floyd A. Yocke has been made manager of camelback and repair material sales. The former Akron division manager of truck tire sales will continue to make his headquarters in the home office.

Raymond H. Fast has been promoted to Denver division manager. He was formerly a special representative for the firm's retail stores department.

The new assistant division manager of the Los Angeles division is George A. Cole. He will be responsible for passenger tire sales.

George E. Bowling has been promoted to manager of truck tire sales for the Akron division.

Laclede opens Tampa plant

Laclede Steel Co., St. Louis, Mo., opened its new steel-fabricating plant in Tampa, Fla., with the arrival of a first barge load of 1,100 tons of reinforcing steel, from the Alton, Ill., plant. The new plant, with rail, shipping, and truck-loading facilities, has Robert D. Edwards as plant manager.

"Fast And Tough As A Texas Jackrabbit...

Our Job-Hopping Trojan 154 Services Three Loading Areas— Keeps Trucks On The Move."

"The Trojan 154 is the spearhead of our operation," says Theodore Collora, President of Atlantic Gravel Co. Not only does it charge the hopper in one area, it handles all the truck-loading in two other areas located a quarter of a mile away . . . and they come in a steady stream! It's nothing for the '154' to handle a minimum of 10 trucks an hour and still find time for other work around the plants . . . And, there has been nothing but normal maintenance and no downtime since its purchase in December 1957 . . . Operator Dick Gant said, "The '154' is worth its weight in gold . . . It's easy to handle and operates fast . . . I really get around in this machine" . . . We say, "Action-Test" the Trojan 154 . . . Your local distributor will gladly arrange both the time and place that best suits your own working schedule.

Complete, detailed brochures are now available on the Trojan line. For your material write to Department C—9 Contractors Machinery Div., The Yale & Towne Mfg. Co., Batavia, N. Y. or San Leandro, Cal.

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YALE & TOWNE

TRACTOR SHOVELS

2 & 4 Wheel Drive Front End Loaders

CONTRACTORS MACHINERY DIV. THE YALE & TOWNE MANUFACTURING COMPANY, BATAVIA, NEW YORK, SAN LEANDRO, CALIFORNIA

For more facts, use Request Card at page 18 and circle No. 384

Michigan excavated this 26 x 32 ft basement through wet, sandy clay in 2 hours.

Torque converter helps operator start and stop the 100 ton tow gently and safely.

Two new "profit jobs" for rubber:

basement digging, heavy drawbar work

This "Michigan" Tractor Shovel has in the past year dug over 80 basements!

It has, in the same period of time, moved over 100 buildings—some of them 5 miles or more—stores, two and three story houses, even a church.

Its work schedule on these assignments has totalled 50 to 60 hours a week, year-around . . . yet, despite the heavy demands, it has lost work-time on only five days since purchase in June, 1957.

Digs 220 cu yd basement in 3¼ hours

"I believe a Michigan could dig basements *profitably* for *almost every* contractor in *almost every* part of the country," says the basement foreman for the machine's owner, Schuette Movers of Milwaukee, Inc. "It digs faster in light clay than any other rig I've ever seen. It works well in medium clays, topsoil, gravel, silt, common earth, and most rocky or sandy mixtures. Typical 50 x 30 x 4 ft excavation takes about 3½ hours—including stripping of topsoil and piling of excavated material next to the hole."

Tows 100 ton load at 8 to 10 mph

"Michigan is a natural for towing very heavy loads too," says Schuette's project superintendent. "We use our 127 hp four-wheel-drive Model 175A to tow buildings weighing, with the dolly supports, 10 to 200 tons each (and sometimes more)! It's a real test for any prime mover, and one successfully passed by the Michigan on over 100 occasions. The machine has no trouble pulling loads uphill or over the highway. It moves buildings 8 to 10 mph on open roads. In town, wires, trees and spectators slow us down; but we still complete a typical one-mile move in about 2½ hours. Michigan's fine maneuverability, good traction and excellent all-around visibility make our work faster and easier. Torque converter lets our operators move at slow, steady speeds without jerking or slipping the clutch."

Replaces back-hoe, crawler-dozers, all-wheel-drive trucks

Other advantages: the Michigan does no damage to paved roads. It drives everywhere without permit. It works full-time, without the limitations of a back-hoe, crawler or big wrecker-truck—all machines formerly used by Schuette for basement excavation or house-moving. It does a host of odd jobs which simplify house-moving. Levels slopes, for instance. Builds roads across fields. Fills holes to provide smooth going. Lowers roadbeds temporarily when overhead wires cannot be removed. Backfills old basements. Rough-grades around new foundations. Lifts steel beams and dollies. Winches buildings into final position. Plows and truck-loads snow. Drives job-to-job, averaging 15 to 25 mph in traffic.

"This Michigan is by far the best Tractor Shovel we've seen," says Clifford Schuette, company president. "Distributor service good. Clark financing arrangements very satisfactory!"

Let us show you—through a free, no-obligation demonstration—how a Michigan Tractor Shovel can cut *your* costs on tough loading, digging, or towing jobs. Eight models, 42 to 335 hp, 16 cubic feet to 6 cubic yards, to choose from. For details, write us direct. Or see your local Michigan Distributor.

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